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THE JOURNAL

OF THE

ROYAL ARTILLERY.

VOLUME LVII.

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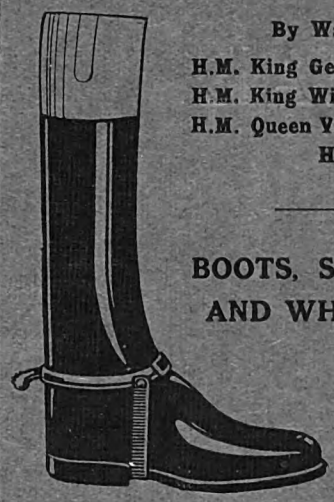

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H.M. Queen Victoria.
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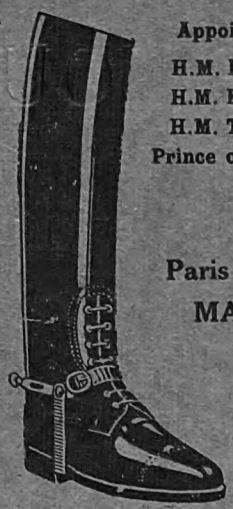

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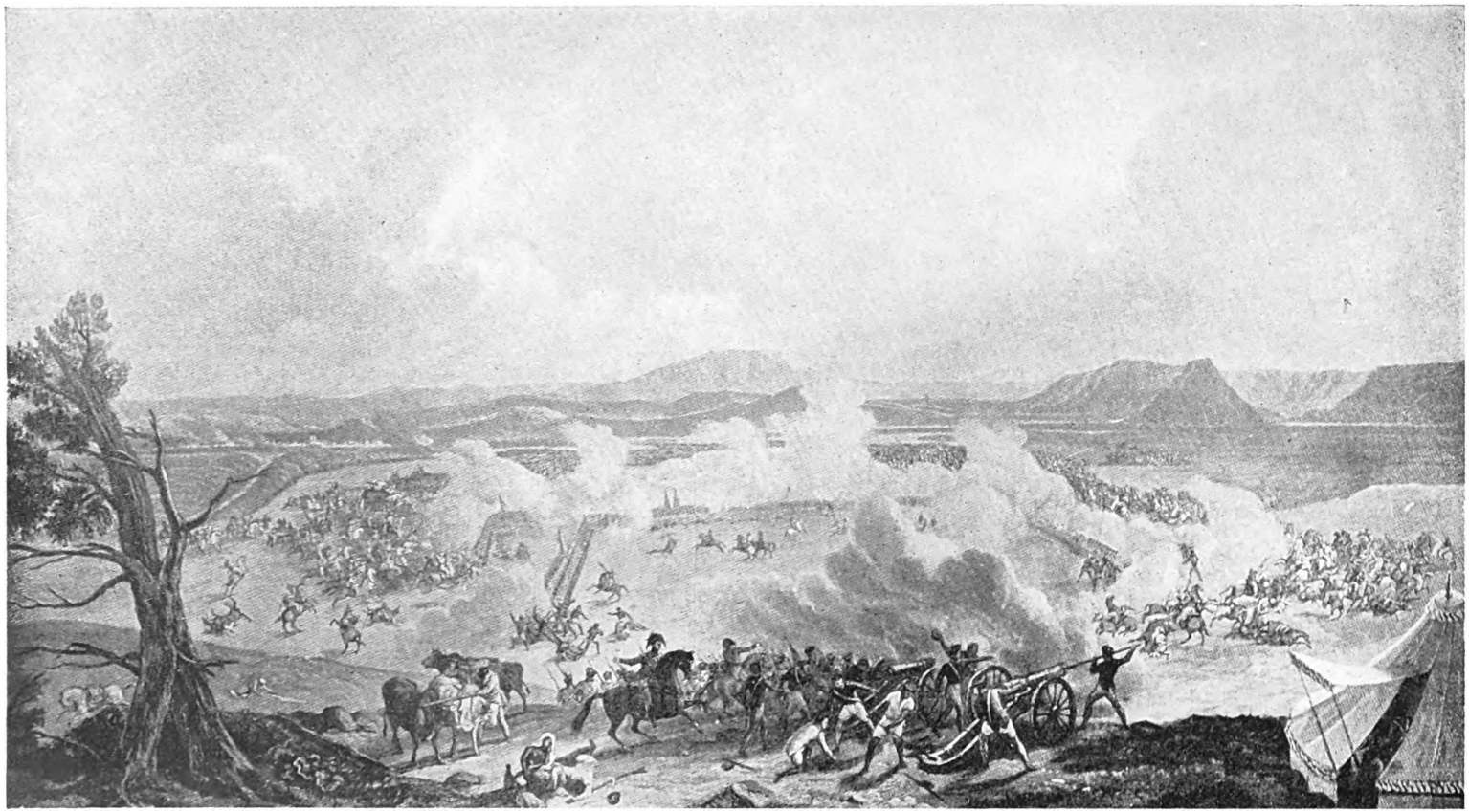

5th November, 1817. [*See p. 81.*

THE BATTLE OF KIRKEE.

(From a painting in the India Office.)

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THE NAVY TO-DAY.

A Lecture delivered at the Royal Artillery Institution, Tuesday, 3rd December, 1929.

BY CAPTAIN J. V. CREAGH, D.S.O., R.N.

Brigadier A. A. Goschen, D.S.O., in the Chair.

CHAIRMAN: I have to introduce to you Captain Creagh who has come down to lecture to us on "The Navy to-day." He is well qualified to give this Lecture, not only because he is Captain Creagh but because he is an officer of great executive experience in destroyers and, in addition to that, he is also Instructor at the Royal Naval War College where he has access to the latest naval ideas of to-day. I will now ask him to give his Lecture.

CAPTAIN CREAGH: Of course all sailors like to associate with their brothers of the Sister Service, and I very much appreciate having been asked to lecture to you to-day. I would like to say what a privilege I consider it to have my friend, your Brigadier, in the Chair.

There is an old proverb "The pen is mightier than the sword," possibly a catch phrase invented by the pacifist of olden days. Both are, however, the weapons of the Statesman and when used in co-operation produce the best results. It is the failure of the pen that necessitates the use of the sword. Though he may direct its use the Statesman has to fall back on the defence force to wield the sword.

In this lecture I propose to give you a glimpse of the fleet as it is to-day, and endeavour to show you how it assists the pen and how it would co-operate with the other two branches of the defence force if we were called upon to use it. I have a large number of Army friends, some of whom have been to sea in ships, but all impress me with their general knowledge of the Fleet. But it is those things that strike the eye or fire the imagination that most impress us; things of equal or greater importance which we do not see are likely to receive less attention. For instance, a battle-

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ship is truly an imposing spectacle but the real reason for her existence is often not understood. I will therefore deal with the subject of this lecture in what you may think an unusual method, and consider it a little more from the abstract and a little less from the material point of view.

With your indulgence I propose to discuss functions of the Fleet both in peace and war. How it carries out its functions in war, the difficulties likely to be encountered and the interdependence of the three military forces. Then the weapons and their carriers and how these are used, and lastly a few observations on matters which are of concern to us and consequently to you.

In peace time the functions of the fleet are of a diplomatic nature. They fall under three different headings:—

Threat of force (an active function).
Influence abroad (a passive function).
Influence in our Dominions and Colonies.

Little may be said of the first, I think we all know its value. A great number of people believe (and most Germans will tell you the same) that had its use been properly understood and acted upon the late war would have been avoided. If true, it is a case where the pen failed because it was not backed by the sword. We paid the premium but did not claim the insurance. There are since the war recent examples of claims being satisfied.

Influence abroad is perhaps not so generally understood. It may result from a respect of strength on account of a feeling of security rather than a threat of force, or from the creation of a friendly atmosphere. As regards the former, a Cabinet Minister, flushed with success after his recent experiences at a conference (a conference of friendly Powers) said: "The words of a nation's spokesman carry great conviction when that nation possesses a powerful fleet."

Visits to foreign countries create a feeling of friendship and good will. A well-known consul general told me that the visit of a destroyer flotilla the previous year had an astonishing effect, and made his work far more agreeable and pleasant. We know that showing the flag has its effect on trade. One has only to read the appeals of the British Chambers of Commerce in South America when the South American Squadron was abolished, to realize how

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much this is so. In showing the flag, much depends on national characteristics. For instance, it is the size of ships that appeal to the Latin races in South America, but the numbers of funnels to some Orientals.

The British Navy has given succour and help in cases of disaster and calamity the world over. It has rendered assistance in earthquake, fire and famine; rescued from shipwreck and piracy; organized hospitals and provided shelter; and in innumerable other ways (for there are unique opportunities) it creates an atmosphere of friendship. The British Fleet is generally looked on with friendly eyes except by the evil doer.

Now we will consider the influence within the Empire, a subject which, although it probably gives us greater satisfaction, I will merely mention in passing. It is the high standard and morale of the seamen of the visiting squadrons that upholds our prestige and revives the sentiment which binds the daughters to the mother nation. Such visits strengthen the feeling that it is in their own interests to remain within the Empire, and assist in consolidating that widespread devotion to the Crown and loyalty to common ideals which form the strongest link between the nations of the Empire. It may be of interest to know that large numbers of Australians travelled over 2000 miles to see an imperial ship.

The fleet cannot perform its peace functions adequately unless it is prepared to continue the policy of the statesman when his pen has failed in its efforts. We will therefore now go on to consider the war functions of the fleet. The object in war is to force the enemy to make peace on our own terms. Clausewitz tells us that a country will continue fighting as long as the object is worth the expenditure. We are therefore confronted with two considerations. We must be in a position to prevent the enemy bringing sufficient pressure on us to agree to his terms, and secondly to force him to realize that it is not in his interests to continue the dispute. One of the chief instruments in bringing about this state of affairs (but by no means the only one) is the armed forces of the Crown, of which the Navy is but one branch.

It is because we are able to exert pressure on land and sea (and it is ashore and afloat where sufficient damage to our interests

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can force us to submit) that military warfare falls under the two main categories—land warfare and sea warfare. Though the fleet is to some extent concerned in land warfare as thus defined—for instance, bombardments of towns from the sea or co-operating on the flanks of an army—I will confine my observations to sea warfare alone. In this, the functions of the fleet may be summed up in the words "The control of sea communications," which being interpreted means:—

To make use of the seas for our own purposes.

To deny its use to the enemy.

This, as you see, brings in two considerations.

The use of the sea is essential for the transport and maintenance of the Army and Air Force; for the carriage of munitions or materials necessary for the use of all the armed forces; for import of food and clothing necessary for the whole population; for the raw materials for factories and the exports which pay for the imports. The importance of the maintenance of trade cannot be minimized. If trade collapses, credit collapses, the collapse of credit means the closing of the world's markets and cutting off of supplies.

With regard to credit a Parisian banker made a statement to Napoleon which may be of interest to quote:—

> "A humiliating fact and one which gives the key to many others," he said, "is the state of credit in France and in England. The English debt amounts to about £700,000,000, ours only to £50,000,000, and yet the English could borrow at need sums much more considerable than we ourselves could, and above all at infinitely more favourable rates."

Trade, like a stream, flows along the line of least resistance. The sea is its natural path. With the development of trade, commerce is taking to the sea in ever increasing proportion. With the growth of civilization, necessities have to be imported in ever increasing quantity from abroad. Even in continental countries it is impossible to divert the seaborne commerce over their land frontiers—some may be so diverted but even then the cost will be greatly increased.

You can understand, therefore, that to deny the use of the

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sea to an enemy, even if it does not stop his trade will considerably curtail it, depriving him of some necessities. It will increase prices, take men from his armies to manufacture and grow what formerly could be obtained from abroad; congest and dislocate his inland transport, making it difficult to move his troops. It will limit the mobility of his forces and safeguard our territories from invasion. Furthermore, it will allow us to bring to our own use the ships and goods at sea intended to assist him in the prosecution of the war.

I have perhaps taken a little time in explaining the functions of the fleet to you as we visualize it in the Navy, so as to indicate to you how essential it is for the other arms that we should correctly perform those functions. Should we fail the others must necessarily fail—should we succeed in sea warfare it must assist in the prosecution of land warfare. Though immense pressure may be brought against an enemy in sea warfare, the process is a slow and tedious one, and even in the old days no country benefited by a prolonged war. For this reason I have taken it for granted that we will have the co-operation of the Army and Air Force, and indeed it must be so in a war of any significance.

I told you that in this brief outline I would deal both with the abstract and material. I would like you to hear what Clausewitz has to say on linking the abstract with the material. "We should lose ourselves in the most soulless analysis," he writes, "and as if in a horrid dream, we should be for ever trying in vain to build up a bridge to link this base of abstraction with facts belonging to the real world. Heaven preserve all theorists from such an undertaking." A very definite warning! To avoid the dangers he cautions us against I will eliminate theories and base my considerations on principles which, though originally theories have been proved by the passage of time and experience to be fundamental truths, applicable at all times and in all places. To illustrate my points I will produce examples from the past. When later on I come to deal with the material aspect I will endeavour to keep thought on broad lines, avoiding detail when possible.

Having explained our functions, it is now convenient to examine the methods of carrying out those functions and the

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difficulties with which we would have to contend, so that we shall clearly understand the use of the weapons and the carriers of those weapons when we come to discuss them. Of course, if we can remove the obstacle which stands in the way the task of control of sea communications becomes an easy one. We may be given the opportunity of destroying or containing the enemy battle fleet or battle fleets which provide the cover under which all other forces act. Even were this possible in the early stages of the war, we would still be confronted with the problem of the numerous enemy vessels, all potential commerce raiders, whose destruction must necessarily be a long process.

Most of us know that Trafalgar was a complete victory, removing the possibility of the invasion of these islands. It increased the mobility of our armies, which could then be moved without fear of disaster at sea and more than ever immobilized considerable enemy forces (forces urgently required in other fields) in order to protect a lengthy coast line from invasion. But it is not generally known that we came nearer to defeat after Trafalgar than before, for we were subjected to the severest economic pressure by the hordes of vessels of every type which were then concentrated on our trade. Bitter experience had taught Napoleon the tremendous pressure exerted by sea power.

Trade is more vulnerable now. Admiral Sims tells us that the loss of a large convoy in the critical period of 1917 would have meant defeat. His fears on our behalf were, I think, exaggerated, nevertheless the vulnerability of our Achilles' heel is well understood abroad, perhaps better than in this country. It will certainly be subjected to a vigorous attack by a future enemy. Our trade routes being vital and necessary for the prosecution of war, it follows that we must protect them against attack. A future Trafalgar would be a mockery if we finally lost the war. If we examine the defence of trade we are bound also to consider attack on trade. If we can succeed in the attack and defence of trade we will be able to indulge in more active co-operation with the other arms. I will therefore base this part of my lecture on the defence of our sea-borne commerce.

As we are apt to draw conclusions from the late war it is well to point out some of the pitfalls of doing so. In future we must

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not expect such ideal strategic conditions. The enemy main bases were in close proximity to one another, and though he possessed a front and back door, the British Islands formed a great natural breakwater across the high road of approach. We soon severed his sea communications and were in a position to stop his indirect supplies whenever the Government should decide the time was ripe. Furthermore, we were favourably placed for limiting enemy interference with the control of our own sea communications. Though we were nearly brought to our knees by the submarine, she was a poor type of craft for trade attack.

It was trust in international conventions to shield us from attacks of this nature that nearly sealed our doom. If we do not recognize its limitations, the pen merely becomes a snare. The lesson that we must base our considerations on principles rather than theories, on realities rather than ideals, does at times seem to be forgotten in the present blind scramble for a permanent peace. The submarine was a new weapon against which no preparation had been made. After groping in the dark for a remedy we fell back on an old principle of trade warfare. The many devices that ingenuity could produce (some of which were never perfected) availed us little, but so soon as we adopted the principle of convoy protection our losses fell, at first with great rapidity, then with a steady progress till the end of the war, in spite of the fact that submarines were used in ever increasing numbers.

Though we were able to limit the numbers of surface raiders to but a few (in spite of the short duration of their activities) such names as the "Emden" and "Moewe" will remind us that the damage done was great. We cannot expect our enemy to neglect our weakness. In the late war one ship alone, the "Wolf," sank 140,000 tons of shipping. In the future we cannot count on a natural breakwater, and as in the past we must be prepared for an attack on our trade by a swarm of raiders. In the Napoleonic wars they were numbered in their hundreds. 743 privateers and 273 cruisers were captured from France alone in the seven years from 1793 to 1800, i.e. over 1000 ships employed on trade attack captured.

Even were our net big enough, numbers would slip through the mesh. Such devices as dispersion or evasion were attended

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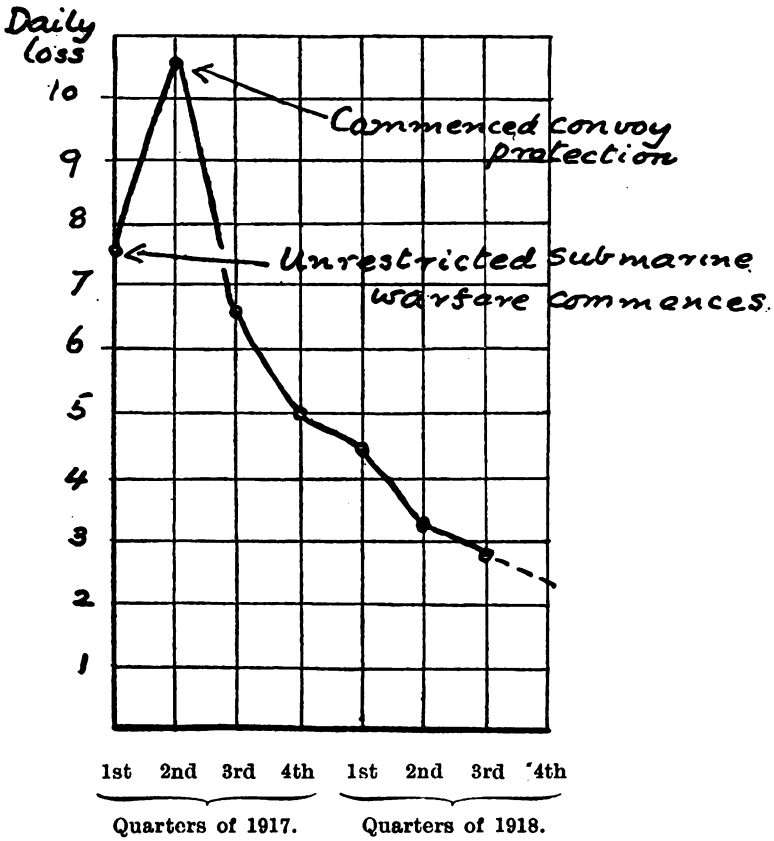
INFLUENCE OF CONVOY PROTECTION.

1917 - 1918.

Average daily loss of Shipping (including allied and neutral vessels).



1798.

In this year Convoy was enforced on Merchant ships and a tax enforced for protection.

Within 12 months the tax was more than paid for by the reduction of Marine Insurance.

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with a measure of success in the late war when raiders were few and without bases. They increase the difficulties of the raider and make him expend more fuel, but do not in the end save the victim. These were only a makeshift and not a substitute for direct protection. With the aid of aircraft and the increased visibility of the raider evasion and dispersal become less effective, and with numbers of attackers they lose their value. It will still be necessary to route shipping clear of enemy territory to avoid the dangers of attack by aircraft and coastal vessels, and perhaps to avoid certain large sea areas altogether. We can with little imagination visualize a determined attack on trade in the early stages, driving us into convoy as soon as we are able to put into working order the huge organization necessary to cope with the mass of shipping spread over the oceans which will require protection. A glance at the map will give you some indication of the volume of this trade. Admiral von Tirpitz said: "The establishment and development of the Convoy System which involved years of work constitutes a tremendous achievement on the part of the English."

We must naturally be prepared before the blow falls. To hunt down the enemy is waste of effort, as Mahan expressed it "like looking for a needle in a haystack." In the late war over thirty cruisers hunted for a single raider; they expended much valuable fuel, but the raider escaped. Convoy has this advantage, that the enemy is brought to the escort.

To be effective raiders must have bases. Without bases defects accumulate, without stores and fuel the ships themselves are useless. We will fall back on another of the old principles of trade warfare, that is to deny the use of bases abroad to the enemy. An ancient Chinese general of great experience writing 25 centuries ago tells us that one bag of fodder from the enemy counts as twenty from our own wagons. I would suggest that this applies with greater force to bases. And here we can look for the direct co-operation of the other forces as we did in the late war.

At the beginning of the late war a committee responsible to the Cabinet decided that operations were to be taken against enemy bases and intelligence centres abroad and that it was to be a governing principle that such operations were to be regarded as designed for the defence of our maritime communications and not

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for territorial conquest. The enemy soon lost the use of his foreign bases and *we* watched with interest and pride the great struggles in France for the Channel ports on which so much depended.

It was for an unromantic reason that the enemy surface raiders interned themselves one by one; they lacked the necessary fuel, except, of course, those one or two whose early destruction saved them from a similar fate. Von Tirpitz speaks of "This cruiser warfare which could not last owing to lack of bases." I have looked up the operations of nine independent surface raiders and find that the average length of their cruises was a little over 3½ months. This does not include the cruise of the "Wolf" which lasted about 14 months operating in unfrequented waters where she made use of secret and temporary bases.

Economy of force will assert itself. Our imagination will naturally conjure up the vision of convoys growing snowball fashion, with increased protection to counter increased attacks on trade. This cannot be done to-day, we have insufficient warehouses and storehouses. In times of peace keen competition in trade prevents the storage of reserves of food and material which bring no profits, in time of war it is too late to start, there will be fewer trading ships to compete with the growing demands, for large numbers of vessels must be used for purely military purposes. It is necessary to keep the steady flow of trade on the move. Though our sea lines of communication are flexible the same cannot be said of inland transport, which would become constipated if it was fed irregularly. We will have to fall back on the old method of providing cruising squadrons or patrols to strengthen the escorts in the fertile areas where the enemy can do the greatest damage. That is to provide forces to attack the enemy in those zones where he must come if he intends to damage our trade with effect.

INFLUENCE OF DEFENSIVE ARMAMENT IN MERCHANT VESSELS.

1916.

(Against Submarines.)

Ship	*Escaped*	*Sunk*	*Total*
Armed ...	76·1%	23·9%	100
Unarmed ...	22·2	77·8	100

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1804.

A convoy of 30 merchant ships, mostly armed but unescorted, beat off a French squadron of:—

1	...	...	...	74 line of battle ship.
3	...	...	...	Heavy Frigates.

The defensively armed merchant vessel will mitigate our difficulties. The great advantage being that such a policy would reduce the number of effective raiders, and would even hinder the cruiser, built and designed as a war vessel, for though the latter could sink the whole of a large unarmed convoy in a short time, some of the same convoy, if it was defensively armed, would have a prospect of escape. The cruiser would be forced to remain at long range, reducing her effective fire and wasting ammunition.

I am confident that circumstances will force aircraft on a possibly unwilling Merchant Navy, and the objections are not difficult to surmount. When necessity dictates, difficulties will (as in the past) melt away. This weapon has the great advantage that its efficiency depends more on the personnel and is not so much affected by the unsuitability of the ship carrying it. So long as they can get up, the type of ship from which they are flown is not of great importance. A large convoy carrying, say, a dozen planes, will be a difficult problem for a cruiser with but two or even four aircraft. While they have a good opportunity of evading her, she would be subjected to a greater offensive effort than she herself could produce.

In our discussion of the subject so far I am sure you will be impressed with the fact that whenever the idea of offensive action is considered in this defensive role our prospect of success brightens. This has always been so, our old Chinese friend tells us: "Everywhere to make preparations is to be weak everywhere" and "While Victory is easy in attack it is difficult in defence"—a lesson which Drake sought to impress on a Queen advised by an over-cautious Burleigh.

In so far as we have failed to exert our maximum offensive effort our policy must be defective or incomplete. I suggest we will find our answer in an old document. "Our Colonies," said the Admiralty in 1750, "are so numerous and so extensive that to keep

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a naval force at each, equal to the united forces of France would be impracticable with double our Navy. The best defence, therefore, for our own Colonies as well as for our coasts is to have a squadron to the Westward as may in all probability either keep the French in Port or give them battle if they come out."

I quote this for it so clearly brings out the policy of cover, a policy which in the late war provided an effective shield between the enemy surface ships and our hard-pressed trade. Enemy heavy ships might evade the watch of the covering force, but experience has shown that when they do escape they are kept on the move by the covering force or a detachment, and are unable to do great damage to the patrolling squadrons and escorts they seek to destroy. I hope I have given you sufficient explanation to indicate that we will have convoys (I hope including defensively armed vessels), lightly escorted, the protection in those areas where the enemy must come to inflict the greatest damage being strengthened by increased escort and patrol and cruising squadrons whose business is to destroy the raiders which the covering squadrons have been unable to contain; all working under the shelter of the heavy squadron or squadrons providing the necessary cover—whilst every endeavour will be made to deprive the enemy of the sea bases necessary for the mobility of his ships.

The system or plan I have outlined will, broadly speaking, provide also for attack on trade. If the home terminals of the enemy's sea communications are approximately the same as ours, as in the late war or in our wars with France, the dispositions of the smaller squadrons may require little or no alteration, they would be able to attack enemy trade as well as protect our own. On the other hand, should the enemy home terminals be distant from ours, our heavy squadrons containing the enemy main fleet will afford cover for the cruisers employed on trade attack, as was the case in the Mediterranean during our French wars. The enemy cruising squadrons or patrols must be removed to facilitate our operations on his trade and this may be undertaken by the heavy battle squadron itself, or squadrons acting under its cover. Of course, the attack on enemy trade will in itself afford protection to our trade, varying in degree according to circumstances. This completes the brief outline sketch of the trade war on which your

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activities, as well as those of all other forces, depend for munitions, material and credit, whether they be armed with the sword or the pen for their co-operative effort against the enemy.

In relation to the conveyance of troops it is unnecessary for me to emphasize to you the vulnerability of troops in transports. The cargoes being precious and irreplaceable it follows that the responsibility will weigh heavily on the shoulders of the naval commander, who will naturally require at least local command of the sea. The same principles, however, hold good, their application varying with circumstances. Escorts would be strengthened whilst it may be necessary for the covering fleet to be in close support. Having discussed its functions and how he can carry them out you will now realize, perhaps, that the future naval commander-in-chief of a limited fleet may again be the only man in the Empire who can lose the war for us in an afternoon.

We will now briefly examine the instruments he has at hand as we find them to-day. By instruments I naturally mean the weapons and their carriers. Generally speaking it is the nature of the weapon that governs the design of the ship. Different weapons require different tactics, the weapon must therefore affect the characteristics of the vessel carrying it. The ideal would be to build the ship round the weapon, but other matters have sometimes to be considered. Economy, for instance, may necessitate that one type may have more than one function, and functions other than purely offensive action may have to be carried out by a vessel carrying an offensive weapon.

The most offensive weapon is valueless if we cannot take it where it is required to be used. You will readily understand, therefore, that we must have the power to move our weapons to any required place and to maintain them there as long as necessary. This we call mobility in which many factors are involved, such as seaworthiness, endurance, reliability and independence. We cannot measure mobility in so many knots as I have heard done. Speed is one of the factors but not the major one in strategy. Mobility therefore must be given due consideration in the design of the weapon carrier. Furthermore it is of little use possessing a weapon with the offensive power of a Goliath if it can be put out of action by a youthful David. So another principle must be considered in the design of the carrier, namely Security.

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When we think of security in this connection we must not have in mind safety first—that leads nowhere except perhaps to defeat. The word security should convey to our minds those factors which will ensure that we have a good prospect of attaining our object, which we may, for our purposes, consider the destruction of the enemy forces. Security like mobility is governed by many considerations such as protection, speed or even offensive power itself, which must necessarily vary with the type of carrier as we shall see later.

I have tried to show you that the three principles, offensive power, mobility and security must be weighed and balanced when the weapon carrier is built. It is the offensive power of the weapon that has been and will be the leading factor in the design, but there must always be the compromise, a compromise which requires adjustment with the introduction of new agencies of warfare and new methods. Different weapons and different types of carriers complicate the instrument with which the naval commander is provided to carry out his allotted task. But a well-balanced squadron is also governed by these three principles, offensive power, mobility and security.

As the weapon and its carrier are interdependent, I propose to consider them together, but before doing so it would seem advisable to say a word or two about the weapons themselves. Weapon does not exactly express the idea I wish to convey to you. You will be able to follow me more readily if you grasp what I have in mind when I use the word in its broad sense. For instance, when in speaking of the gun—which term I may use for convenience—I have in mind the projectile it so noisily hurtles into space, it is not the thunder of discharge that matters, it is the fall of shot that counts. I have heard the word "precision" used in the classification of weapons, to me it conveys nothing, my experience is that all weapons miss more frequently than they hit, and in all cases the hits vary greatly with the range. It is the volume of effective fire that decides the value of the weapon.

The main offensive weapons in use to-day are:—

The gun—a high velocity weapon with great penetrating qualities. It can be discharged at an enemy from any bearing within range.

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The self-propelled torpedo—a weapon of relatively low velocity. The area from which it can be discharged is limited by considerations other than range.

The inert bomb (in which I include the aerial torpedo and the depth charge). This has little or no penetration and has to be discharged or dropped on an exact bearing.

It follows, therefore, that the carrier whose main weapons are other than the gun is liable to attack while it is getting into position to use its weapons. Therefore speed to reduce time under fire, and a small target area to reduce the probability of being hit or invisibility are factors which must be considered in the security of such vessels.

Now a word about aircraft. Owing to its lack of mobility as we now understand it, though the aircraft is itself a carrier it can be considered in the light of a long range weapon, which is discharged from a carrier specially built as such. In this lecture it will be convenient to consider it in that way. This fact greatly complicates its use as a weapon, but like other weapons its value is measured by volume of effective fire. It has yet another characteristic and one of the greatest value to the naval commander, namely its great use in reconnaissance. It can be likened to a long range telescope.

These are the main weapons and now we can proceed to discuss the weapon carriers and how they may best co-operate. We now know that there will be a number of ships and squadrons attacking and protecting trade and carrying and maintaining the Army and Air Force in their various theatres of operation, all working under the cover of the main squadron. The dominating factor of this covering force, whose business is to give battle, is the battleship, the main weapon of which is the heavy gun. This is the carrier in which we find the greatest offensive power combined with mobility and security. Owing to its weapon, which penetrates into the vitals of a ship, and the great volume of fire which can be developed, it is capable of producing greater effective fire than any other type of craft. The great floating platform necessary to carry the heavy guns provides sufficient space to allow for a secondary armament, valuable for offence against the Davids who may seek out the Goliath. The deck protection provided against the

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offensive blows of other battleships also provides protection against the bomb. With relatively little additional weight it is protected against the torpedo or mine. This protection, in the form of additional watertight sub-divisions and bulges, may be used for additional fuel, so increasing endurance.

The battleship cannot effectively bring into action the other weapons owing to their characteristics, which require different tactics. Moreover, she can only carry a few aircraft without detracting from her offensive value. To deliver the greatest blow on the enemy or, may be, even to make it possible to deliver one, it is necessary to introduce other types of craft to work in co-operation with the battleship.

You will now more easily follow me if we assume that we desire to bring the enemy main forces to action and that there are three stages, viz. :—

1. The enemy proceeding to sea.
2. Closing to make contact.
3. The battle fleets in action.

First it is necessary to know where the enemy is, when he puts to sea, his composition and the direction in which he is proceeding. For this reconnaissance is necessary. It is an aid to mobility, for it assists the battle fleet to proceed where necessary, in order to destroy the enemy.

Reconnaissance can be carried out by the submarine or surface craft. Close blockade being no longer feasible on account of submarine and air attack, the main fleet may be several hundreds of miles from the enemy in his base. The submarine, on account of its vulnerability on the surface and its slow speed when submerged, is not the ideal type of vessel for fleet reconnaissance at sea. But as her characteristics allow her to operate in waters denied to surface craft, she may well be the best type for such a situation as we now visualize, namely, distant blockade or, as Nelson would have called it, the watch on the enemy fleet. Once the enemy is at sea, reconnaissance would generally be more easily carried out by surface craft, either using their aircraft or by shadowing when conditions are not suitable for the former. Reconnaissance, which in the past was measured in tens of miles, will (in the war of to-day) be extended to its limits, with the aid of aircraft. Had Nelson

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possessed our facilities, the Toulon fleet would not have evaded him in its dash to the West Indies and back.

Once having located the enemy at sea, we may be confronted with another problem, that of bringing an unwilling enemy to action, a problem which now, as in the past, must necessarily present difficulty, as the speeds of the battle fleets vary but little. Here again the modern auxiliaries to the battle fleet—the new weapon carriers—which are themselves unable to destroy the enemy, may assist our battle fleet to do so, by inflicting sufficient damage on him to reduce the speed of his main force, which it is our desire to meet.

Having discussed the battleship, this would seem an appropriate place to discuss the different types of auxiliary weapon carriers, and, as we have already mentioned the submarine, I will continue to discuss her. Her great attribute is that she can operate unseen. Her construction on this account renders her very vulnerable, for if she sustains slight damage on the surface, she cannot dive, and if holed under water, her lack of buoyancy would probably cause her doom. Invisibility gives her security, and on this account she can operate in areas denied to surface craft, and the torpedo, which can be discharged unseen, is therefore her natural weapon. Her surface speed is less than that of the battle fleet, and when submerged it is very slow. Perhaps hunted and harried by numerous surface craft, and from the air, she may not inflict great damage to the enemy main fleet emerging from his base. In any case, we would probably desire the fleet to come out, as Nelson did during his distant watch off Toulon when he wrote "every opportunity has been given to the enemy to put to sea," our object being—as his was—its destruction, so that we can the more readily concentrate our efforts on the control of sea communication. Reconnaissance may be of greater value than damage to the enemy which may induce him to return to the base where he can be repaired. If we can foretell his course after leaving, which may be possible, the submarine would be a very valuable asset in inflicting damage on the adversary. She is a ship of great strategic value.

The aircraft carrier of great size and restricted defensive gun armament is vulnerable to any form of attack; comparatively little damage inflicted on her may put her out of action as a carrier.

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With her valuable load she must ever be a matter of concern to the Admiral. The aircraft carriers are likely to be the subject of early attack, for to obtain air superiority has a cumulative effect, the carriers themselves being very vulnerable to bomb attack. It does not take great imagination to think of them in the light of a striking force, but they need protection from surface craft as well as from the air, and we must look to the cruiser for the former and her own aircraft for the latter.

We will have already gathered that the calls on that valuable type of craft, the cruiser, will be many; with the advent of the latest weapon it would seem that its value has increased. With the fleet, the most important role of the cruiser is likely to be to provide reconnaissance and deny it to the enemy; with the aid of aircraft this reconnaissance can be extensive in depth, and we must remember we can no longer visualize an operation area limited to the North Sea. Conditions will often render it necessary for aircraft operating from cruisers to return to the aircraft carriers thus reducing their effective range.

The cruiser (a gun carrier) though carrying torpedoes, is far from ideal as a carrier of the latter weapon, and furthermore they are too valuable to be generally used as torpedo craft against heavy ships; we must therefore fall back on the destroyer, which can be easily handled in flotillas, and which can yet produce a great volume of torpedo fire, after allowing for heavy casualties, when pressing home torpedo attacks to effective range. Destroyers, which owing to their small silhouette can see at night without themselves being visible, are ideal for use at night. Moreover, they possess the means of turning day into night locally, when their gas or smoke cloud does not interfere with the offensive blows of the heavy ships. These craft may be valuable in delaying the unwilling enemy fleet, but they require the support of cruisers by day to protect them from enemy cruisers and small craft when developing their attacks. They will rely on their speed and smoke screens during the attack for reducing the time in which their anticipated victims will endeavour to put them out of action.

You will see now that each type of weapon carrier is dependent on another to ensure the maximum effect. Though co-operation is valuable, they can of course, act independently, and may achieve

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success in this stage of the operations (before contact by the battleships) by reducing the mobility of the enemy in order that our main force may deal the death blow.

We are now ready to go a step further and picture to ourselves the meeting of the battle fleet in an action, on the result of which so much depends. Here the auxiliaries may co-operate in two ways—directly or indirectly. Directly by contributing to the volume of effective fire using their own main weapons, or assisting in the control of the main weapons of the heavy ships. Indirectly by reducing the enemy's main weapon power in a number of ways, such for instance as damaging the enemy (which we hope has already been commenced before the contact of the main forces), drawing his fire whilst in action, disconcerting him in his heavy duel, or causing him to expend ammunition necessary for other purposes. The value of submarines as a fleet unit is obvious, but to have a tactical value in battle they require a good margin of speed over the battleship, which at present they do not possess—speed necessitates length of vessel and steam propulsion; length means unhandiness, and steam means intense heat when submerged. The value of aircraft too as an offensive weapon is great, but is somewhat reduced by the vulnerability of the carrier, which itself is liable to air attack—and in view of other important roles, it seems that their difficulty will be to arrive in sufficient numbers at the right time and place to produce the maximum volume of effective fire. Cruisers in the battle have a most important role, that of dominating the area which the surface torpedo craft require for developing their attacks, but in view of their other duties in connection with the attack and defence of trade, numbers with the fleet may be few.

He would be an optimistic commander who relied on his own flotillas to protect him from attack by enemy destroyers (but this role may be assigned to them). They are poor gun carriers and are unable to stop such attacks in the few minutes during which the enemy flotillas are deprived of the close support of their own heavy ships. The offensive power of the torpedo is limited, but this deficiency is compensated for by numbers carried in the destroyers. The effective range is short, and attacks must be pressed well home. In spite of heavy casualties, flotillas may still remain a potent threat.

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It is obvious that synchronized attacks by the craft whose tactics are governed by speed would add considerably to the value of the offensive action, owing to the complication of the necessary defence measures. Timing may be difficult, but it is in this way that the auxiliary weapon carriers can, it appears, best assist the battleships in their persistent heavy gun duel. And it is the side which delivers its blow first that deals the hardest blow. It may allow of the application of that principle used with such ability and effect by Nelson, namely, the concentration of the whole of his own force on a portion of the enemy.

In a limited time I have endeavoured to give a general idea of the main fleet weapons and the vessels that carry them, and have suggested how these weapon carriers may be called upon to co-operate in different stages, but the dominating factor is the battleship. I told you that there were three matters which must be considered in the design of ships and in the composition of a squadron namely, offensive power, mobility and security; there is yet a fourth—the most important namely, efficiency. We can visualize this somewhat complex instrument we have been considering as a great machine with a number of cog wheels each having its own use and fitting into its own place. The weapons and their carriers must be efficient for the use to which they are to be put. It is well to remember that the motive power of the machine is human, it is a living force responsive to the human touch. It is on the skill and ability of the personnel to wield their weapons and handle the carriers that the result will depend, and of course, it is the responsibility of the Commander in time of peace that they are prepared for war.

Before concluding I would ask you to pause a moment and consider what lies behind the fleet, the reason for its existence and without which it is of little value. I refer to the Merchant Navy which in war has carried on overcoming difficulties and undaunted by dangers. By their unrestricted submarine campaigns the Germans endeavoured (but failed in the attempt) to break that spirit of sturdy independence which is the characteristic of the officer and seaman of the British Merchant Fleet, without which the land and sea forces would have been impotent to wield the sword which finally enabled the pen to dictate peace.

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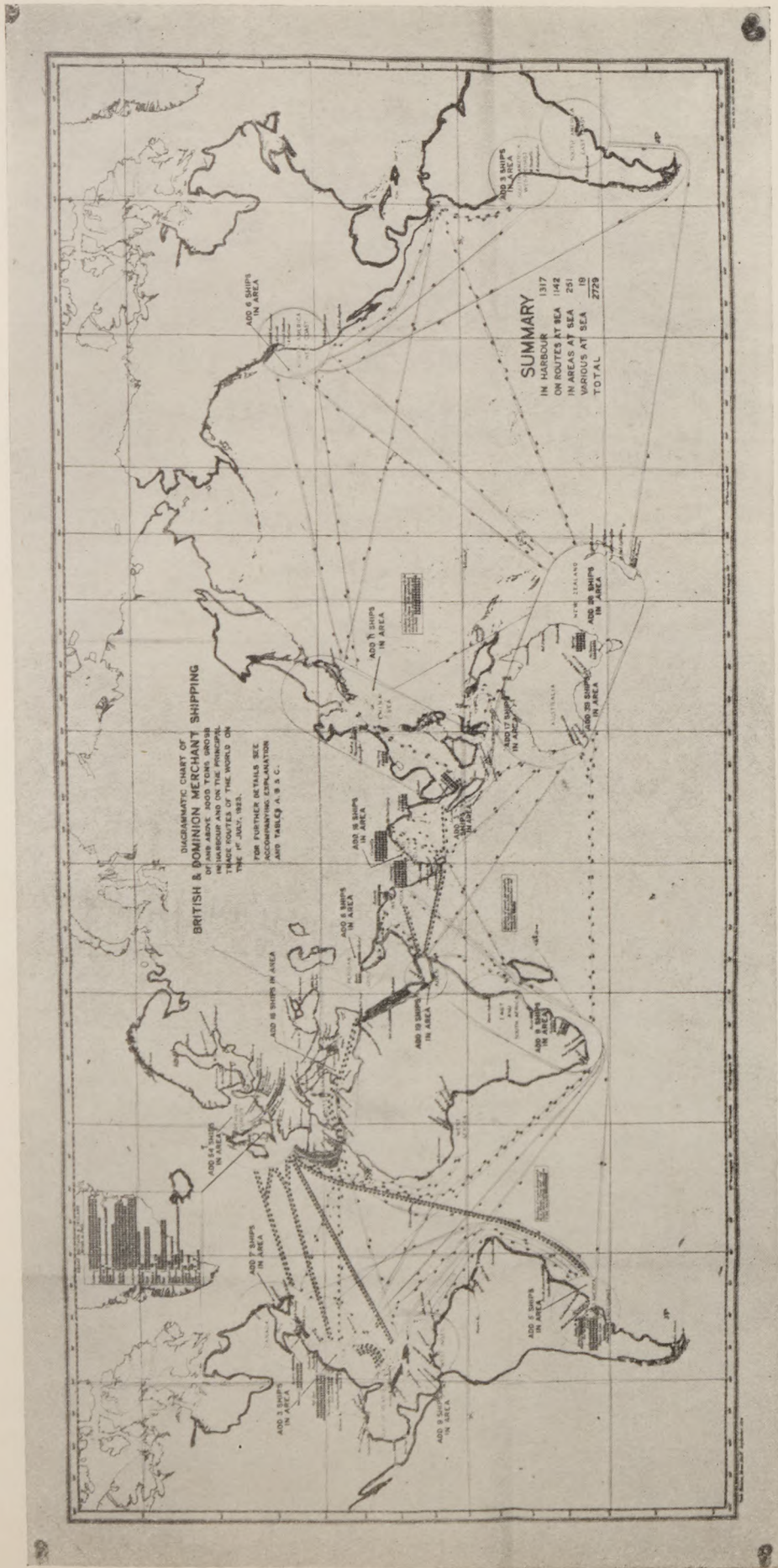
DIAGRAMMATIC CHART OF
BRITISH & DOMINION MERCHANT SHIPPING
OF 1000 TONS GROSS AND OVER
IN HARBOUR, ON THE SEAS AND
TRADE ROUTES OF THE WORLD ON
THE 1st JULY, 1923.
FOR FURTHER DETAILS SEE
ACCOMPANYING EXPLANATION
AND TABLE A, B & C.
SUMMARY
IN HARBOUR 1317
ON ROUTES AT SEA 1142
IN AREAS AT SEA 251
VARIOUS AT SEA 19
TOTAL 2729

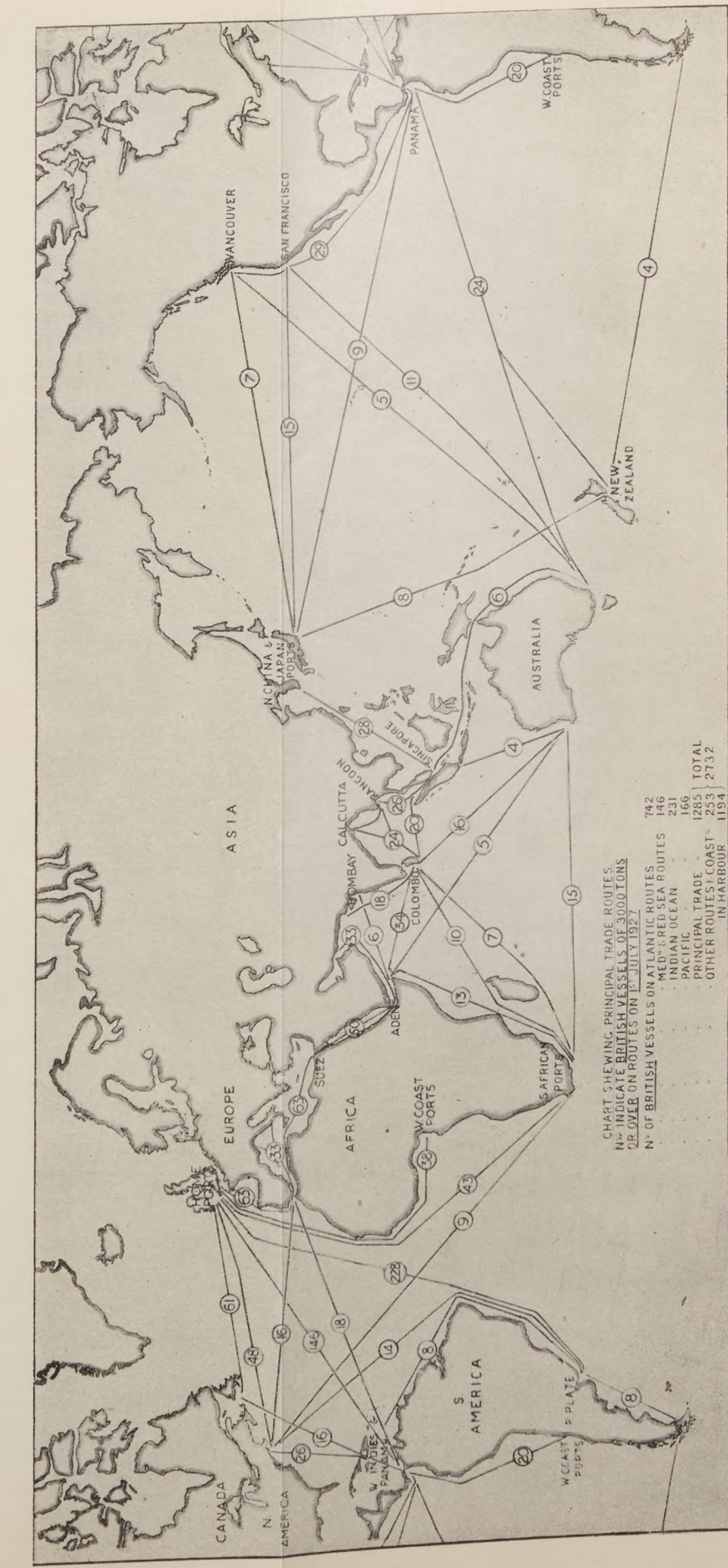
CHART SHEWING PRINCIPAL TRADE ROUTES.
Nos INDICATE BRITISH VESSELS OF 3000 TONS
OR OVER ON ROUTES ON 1st JULY 1927
No. OF BRITISH VESSELS ON ATLANTIC ROUTES 742
MED. & RED SEA ROUTES 146
INDIAN OCEAN 231
PACIFIC 166
PRINCIPAL TRADE 1285 TOTAL
OTHER ROUTES & COAST 253 2732
IN HARBOUR 1194
EUROPE
ASIA
AFRICA
AUSTRALIA
NEW ZEALAND
CANADA
N. AMERICA
S AMERICA
VANCOUVER
SAN FRANCISCO
PANAMA
W COAST PORTS
CALCUTTA
BOMBAY
COLOMBO
ADEN
SUEZ
SINGAPORE
RANGOON
AFRICAN PORTS
W COAST PORTS
W INDIES PANAMA
W COAST PORTS
N. CHINA & JAPAN PORTS

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CHAIRMAN: I think it is hardly necessary for me to emphasize the necessity of the Army of to-day understanding the Navy of to-day. Our feelings towards the Navy are affectionate feelings; perhaps I may say they are very much like the feelings of a younger brother towards his elder brother. We admire them for the kudos that they bring to our family, and for their efficiency, but we are often very anxious that they should not secure more than their due share of the family budget. When we feel like that it is very necessary that we should be able to produce adequate reasons for sometimes withholding from them the support which they may desire. Captain Creagh has laid emphasis on the primary role of the Navy as being the maintenance of our sea communications. That requires a limited number of overseas bases. It requires more—defended ports, coaling stations, and so forth; it requires of the army a defensive role. Every one of those ports or harbours, or bases, demands personnel, material, and money, which we would very much like to see devoted to other purposes. Therefore, many of us may have the job in the future of carefully scrutinizing the Navy's demands for increased scales of defence of those overseas ports. In order to be able to scrutinize them sensibly it is very essential that we should understand on what grounds the demands are put forward so that if they are legitimate and for the good of the family, we will be ready to give freely, but if we do not think they are, we will certainly do our very best to curtail their demands in order that we may have the maximum amount of offensive power to fight our own battle. I should like to assure Captain Creagh that although this audience is small it is at least very select, and through our Journal he will be broadcasting an appeal to a very much larger number of gunners. We all thank him very much indeed for coming here to lecture to us. (Applause).

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THE NEW ARTILLERY.

By Brigadier R. G. Finlayson, C.M.G., D.S.O., A.D.C.

To those who have been in the Regiment for many years and who have watched carefully the progress of training and fire application of Field Army artillery during and since the Great War, the title of this article will be immediately understood; the Regiment has made immense strides forward since those pre-war days when very few, if any, were able to realize the demands war would make upon the Royal Artillery. These immense strides forward continue, ever quickening as civilization evolves fresh warlike tools, and it is hoped that by drawing some comparisons between the field army artillery of to-day and that of some 25—30 years ago, it may be possible to derive some ideas as to where the latest notions on the tactical application of artillery fire and training are taking us. It is also hoped that this comparison will lead us on logically to the consideration of some of the methods by which the tactical application of fire may be brought about.

Before proceeding further, however, one should say that it is not unreasonable to suppose that some of those, who were in the position of leaders of the field artillery of 25 to 30 years ago, will read this article—at least, it is rumoured that there are a few retired officers who cannot break themselves of the habit of reading the R.A. Journal. It is hoped that such, and indeed all those past officers who helped to build up the Royal Artillery into what it was in 1914, will graciously accept any criticism of conditions in their time simply as an attempt to indicate to present day officers where the process of evolution is leading and how the Regiment must keep up with the times.

The point it is chiefly desired to bring out is how the work and the responsibility of officers of all grades in the field army artillery become more and more responsible as time goes on, how it is necessary to recognize this and to train officers so that they will be able to meet the fast altering conditions. It is not enough to look back some years upon what officers of equal rank then did; they did very well in the conditions of their time, but

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those conditions have altered, vast progress has been made and the work of officers of to-day must keep pace with evolution—or even a little ahead!

To begin with, consider for a moment the work of the officers of 25 years ago, rank by rank, and those of to-day. Take first the subaltern, who to-day has far more technical knowledge than his confrère of 25 years ago and works far harder at his profession; much more trouble is taken by his superiors to teach him his work, both technical and tactical, and the N.C.O's and men he has to deal with to-day are far better educated and more amenable to instruction and discipline than those of what, for to-day's subaltern, is the "Old Artillery." Yet, with all these extra qualifications and advantages, with the N.C.O's and men of much better mental quality, do we make any more use of our subalterns than formerly? No, hardly one bit, except for the G.P.O. whose job, it is agreed, is far more technical and responsible than that of the senior subaltern in pre-war days.

Next, take the Captain. These now all have the experience of a great European War—many in command of batteries—most of them have been through course after course since the Great War, and have the untold opportunities never vouchsafed to the captains of 25 years ago. They ought therefore to be very highly efficient, far more so than captains of the dim past, about whom it used to be said "they know everything, but do nothing." Do we ask the present day captains to do any more? No, not one bit! They still carry out a task in the field which can easily be run by an ordinary B.S.M., by the B.Q.M.S. or even by a good Farrier Sergeant. Isn't it a waste? We really ought to find them something more advanced, more commensurate with their qualifications, to do.

Then comes the Major. In pre-war days it was as a rule the major who, exactly contrary to the dictum of the wits of the period, "Knew everything and did everything." It is certain that a battery's reputation was made by the major and by no-one else, though it might easily have been marred by less responsible officers. This is exactly the same to-day, and the major has similar but more exacting responsibilities; it is true too that he carries out his fire application duties more scientifically than his brother major of

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25 years ago and that he certainly is beset with greater technical difficulties; in fact, he has to have a G.P.O. as well as a B.C.A. to assist him. Thus, so far, it seems that the major's position is the only one which has gone ahead and is more in keeping with the times.

Now we come to the Lieut.-Colonels. It is difficult to compare their action or lack of action of some 25 years ago with what should be the energetic activity of the present day R.A. Brigade Commander, for then the battery was without question the only artillery fire unit; the Lieut.-Colonel, though technically responsible for the training of his batteries, rarely took a hand in anything outside the brigade office except for an occasional "Brigade Day"; even on such days the dice were usually heavily loaded beforehand so that everyone knew just what to expect next. For example, it was not till about 20 years ago that it was just beginning to be realized that it really was possible, by care and training, to get the brigade field telephones to work successfully; this opened up a new vista for Brigade H.Q. and the brigade which had a lucky day at camp with its telephones was certainly assured of a "First," if not a "Special." But most Lieut.-Colonels of those days did not take kindly to the brigade telephone system, nor as a rule to anything else to do with the tactical and technical efficiency of the batteries. These matters more often than not were left to the majors, who sometimes co-opted the adjutant. The major still "did everything," which frequently included a certain amount of browbeating of the brigade commander.

It was not until a little later that the lieut.-colonels began really to lead their brigades and to try to treat them as something other than a series of batteries inexplicably banded together under their command. These lieut.-colonels generally could be traced back to the men who had been junior majors or senior captains in the early days of the South African War, which taught them that in the army there really was a profession with serious work to do—especially for the artilleryman, there was something to learn and something to teach. Before the "arrival" of these lieut.-colonels, it was not at all uncommon for a really strong major simply to decline to carry out some idea of the lieut.-colonel's. The lieut.-colonel—if leisurely inclined—feeling that each battery was an

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entirely separate unit practically "on its own" and knowing that he had a very strong major or two to deal with, naturally followed the line of least resistance; after all was said and done, what use could he be tactically in a brigade which had practically no telephone communications and wherein the battery was really the unit? The natural result was that, until those bright young majors emerged from the South African War and became lieut.-colonels, many brigade commanders perforce took a limited interest in their brigades and had very little influence over the training of the artillery of the field army as a whole.

From the above brief sketch it is seen that the modern battery officer is really far better prepared—simply on account of the evolution of things—for his work than his equals in rank of 25 years ago and consequently should be capable of much more in the field; yet he performs in some cases almost exactly the same tasks as his predecessor. It must appear to anyone that this situation is uneconomical and that the army is not getting the utmost value out of its present day highly trained artillery officers.

If such is the case, what then should these officers be made to do which is so very different from what officers of equal rank have always done?

In order to answer that question, consider once more the subaltern, who is now so well equipped by excellent courses at Larkhill and possibly others elsewhere, by prolonged and constant practice on the miniature range, and by frequent small tactical exercises without troops, that he is almost a knowledgeable battery commander already. He certainly requires more practical experience in tactics, but in theory he knows as much as most majors, especially on the technical gunnery side. It seems extravagance to confine a man with that knowledge entirely to commanding a section. Why should he not be used for some of the many other important tasks for which officers are required but cannot be obtained? For example, once the infantry have begun to move, the battery commander requires to be kept informed of all movement and progress of our own troops on the front and flanks. This information it is impossible for the battery commander to obtain in time for practical fire application except by sending off good and understanding individuals to search it out. If he will only

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recognize it, he has the officers already at hand to do this task, but he will have to train them carefully to carry out such missions intelligently and with despatch. In the late war, subalterns were often employed in the above manner, but this aspect of their work is being lost in peace training. "But," the die-hard will say, "it is undesirable to leave a N.C.O. in command of a section except for very short periods." To this the answer is "No; it is very necessary that the present day N.C.O. with his excellent education should be made frequently to command a section; thus a subaltern officer is freed for the very essential tasks outlined above, and, in addition, the best N.C.O's obtain that practice in command which will enable them to take their places as officers as soon as 'expansion' takes place. If it becomes the custom in peace time for a No. 1 to command a section, and indeed to take charge a good deal more than he is allowed to do at present during training, all good N.C.O's will gradually train on to be good section commanders in war. Then the section officers can be taken away at will, returning to their sections now and again from the missions of liaison, reconnaissance, observation, etc., which they may have been sent out upon."

There for example is something extremely valuable for the subalterns to do. It is a task which cannot be picked up in a day or two; it means training the subalterns in the right atmosphere of war and certainly painting to them the correct picture of war, so that they will gradually learn what the B.C. requires, and will soon appreciate that information which the B.C. must have at once or can afford to wait for. That high standard of training is not reached yet in the R.A., but since it has been so clearly and frequently laid down by the C.I.G.S. that the first duty of commanding officers is to train their officers, matters are improving.

Now turn to the captains to examine how it should be possible to obtain better value from the advantages and training that they have had. Why not rope them in also for "visiting" or "liaison" duties, in addition to letting them oversee generally their present task? They could be used for more important missions, say to neighbouring formations; they could be used to reconnoitre for better and alternative O.P's and positions. These "alternatives"

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are very freely talked about at conferences, etc., but on manœuvres they are never occupied and almost as rarely selected. Once a battery has had a good shelling in war, things will be different and the captain will be sent out to find the alternatives. But why not train him and the R.A. to it in peace? There is no "drill" nor a real understanding about such matters, nor for the relief of the B.C. in the O.P. by the captain, a thing that is never practised in peace—unless directed by a "Camp Staff."

It seems certain that at practice camps and in war, a good deal more could be done to elevate the captain's job, which during peace time is usually confined in action to going through the motions of replenishing casualties and ammunition. These are not inspiring tasks for many captains and one feels that they will develop into finer battery commanders if they are given a more active part earlier in their careers. As already stated, any reasonably good B.Q.M.S. could carry out the captain's present task in action, but add to his duties matters such as the organization of anti-tank defence, reconnaissance, the more important liaison duties, relief of B.C. at the O.P. and other active work of that nature, and our captains would have no need to complain that they have very little to do in the field.

It does not appear that very much new can be brought into the major's task. He has always had to command and must go on doing so; he has always had to use initiative and must go on doing so, for it is the battery commander's initiative, plus his advanced observer's initiative, which should keep the attack gradually and persistently flowing forward or should maintain the defence, as the case may be. Thus the major has a heavy responsibility and must go on having it; in short in the "New Artillery" the rule is that, "The major knows everything and does a great deal," and the only new duties one could fairly impose upon him are probably those of more clearly directing, early in an action, all arrangements for the selection and possible use of alternative O.P's and positions, for anti-A.F.V. defence, for the systematic collection and circulation of information, for all necessary patrols and liaison. Some of these matters are never organized at all in a battery—or, at best, far too hurriedly. If B.C's trained themselves to do all these things automatically as soon as the battery is ordered into action

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and, at intervals during the day, arranged to be relieved of their observation and fire duties so as to give themselves time to look round, to study the situation and to think ahead, it is certain that batteries would find themselves more abreast of the situation, and better able, on their own initiative, to bring timely help to where it is really required.

All the officers except the lieut.-colonels have now been disposed of and, if this were 25 years ago, one might almost finish at this point so far as the actual training and handling of the artillery in the field are concerned; but, far from that being the case, it is no exaggeration to say that to-day the lieut.-colonel's task in the field is far more important than that of any one else in the brigade; in fact, he is the brigade—provided he is a good up-to-date lieut.-colonel—and the artillery of the field army cannot assist the other arms to the fullest extent unless the lieut.-colonels R.A. are functioning correctly and really hard all the time. It may be said that the changes suggested above for the work of subalterns and captains do not really amount to very much, and perhaps that the modification of the major's work is not much to speak about, but when the demands upon the R.A. brigade commander of to-day are compared with those that were made upon lieut.-colonels R.A. of 25 years ago, it will be seen at once how very drastically ideas have changed and are changing; it will be felt also that those who serve in the R.A. of to-day really are the "New Artillery" as compared with that of quite a few years ago. This latter, that "Old Artillery," was good for its day and its purpose; no better disciplined nor more gallant troops ever stepped onto the field of battle, and very proud the present day Gunner should be to consider himself a descendant of it and to be allowed to share in its traditions. But time, progress and developments alter circumstances, and, though discipline and gallantry are still essential qualities on the battlefield, the methods and weapons of possible enemies have so improved and multiplied that the highest technical skill and considerable scientific knowledge are required in all R.A. officers to enable them—given approximately equally efficient weapons on both sides—to compete successfully in modern European war.

Now, if the above be accepted, it is possible to begin to arrive

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at where the lieut.-colonel R.A. of to-day comes into the picture. His duty is not only to co-ordinate all the efforts of his brigade towards defeating or impeding those portions of the enemy found on the front allotted to his brigade, but also to be prepared at any time to switch the fire of his brigade as one "block of fire" to practically anywhere on the divisional front. This co-ordination perhaps does not sound difficult nor does it appear at first glance to amount to much, but for the modern lieut.-colonel R.A. who sees well ahead, is alive to the full requirements of successful fire application and is also imbued with the determination that by means of his tactical instinct and by "Gunners initiative" he will keep the attack flowing at all costs, there is so much to do that it is a question as to whether his staff should not be increased in some way or another. There is no doubt whatever that he himself must possess initiative, intellect and the power of training in a very high degree.

Of what then does this co-ordination of the brigade effort consist? What is it necessary to do to bring it about successfully? These are two distinct questions, and an attempt will be made to answer each separately and fairly fully, for in the writer's view, if the necessity for this co-ordination is not realized and if the brigade is not trained to bring it about in the simplest, quickest and most accurate manner, much value for money expended on personnel and material is lost and the army is not obtaining more than perhaps fifty per cent. of the power that is put into the hands of a brigade commander R.A.

Now, in regard to the question of what this co-ordination is. The answer is that it is the combination of every kind of effort in the brigade to bring about, at the will of its commander, a concentration of the brigade's fire power at the right point and time. That, like many other things, is easy enough to say but it is not so easy to do; in fact it is, in some circumstances of mobile war, such a high test of a brigade's efficiency and of the brigade commander's own initiative and power of training that it is probably not every brigade which will be able to do it effectively when the time comes.

This leads to the other question, viz.:—what is it necessary to do to bring about the co-ordination of the brigade effort success-

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fully? Unfortunately this question cannot be answered as easily as the first, and moreover the answer would not be given fully in less than considerably more pages of this journal than this article is meant to cover. In attempting to answer it, therefore, only three main lines, amongst the very many in which a modern R.A. brigade commander has to train himself and his brigade will be discussed. If the brigade commander does not train himself and his brigade in these, no-one else will do it for him, for each is distinctly a "brigade duty" and is outside the responsibility of the battery commanders; if this training is not good, the brigade will not pull its weight and had better have another commander, for it then is out of date and does not belong to the "New Artillery." These three main points are:—

(a) Organization of the observation of the brigade.
(b) Training of the brigade in the various methods of bringing about a "brigade concentration of fire."
(c) The establishment in the brigade of a quick, simple and accurate "brigade intercommunication system and drill."

It is well now to add some remarks about each of these main points in the hope that they may be some slight contribution towards that ideal goal which all Gunners seek—i.e. the power so to apply artillery fire both in regard to place and time, that in the attack our infantry may arrive within assaulting distance with practically no casualties nor loss of time; and, in the defence, so that the enemy's attacking troops never arrive within assaulting distance at all.

With regard to the "organization of the observation." It seems to be generally accepted nowadays, that owing to the strength of defensive weapons, concentrations of the whole of a fire of a brigade R.A. may frequently be called for during an attack in order to comb out certain areas. Again, when acting on the defensive, the enemy will surely try by means of H.E. shell, gas or smoke to destroy the defender's artillery observation.

Both the above circumstances call for the careful organization of the observation in the brigade by a co-ordinating authority—i.e. its C.O. In the first case, he must be sure that the whole front for which he is responsible is seen by some or all of his O.P's, and that whenever occasion demands he can call upon the O.P.

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observing an area to control a "brigade concentration" on to any desired locality in that area.

For the second eventuality, he must ensure such dispersion of his O.P's that not more than one or two are likely to be blinded at one time.

Further difficulties in the organization of observation arise when a rapid advance or pursuit commences. The difficulties increase as the rate of advance increases, for cable runs short and it may often be impossible to maintain more than one or two observation lines. When the batteries of a brigade are "stepping up" as in an advance, one line for each two batteries is probably all that can be maintained. The whole matter, however, depends upon the brigade commanders who must realize that they have far more "fire" responsibility than lieut.-colonels R.A. ever had before, and that it is up to them in each case to appreciate the situation in all its aspects of requirements, time available, rate of movement, ease of observation, enemy activity, amount of cable remaining, etc., etc. On that appreciation they must order the minimum observation that must be provided and who will provide it.

This question goes of course far deeper than at first appears, for on the observation "lay-out" depends very largely the communications "lay-out," and so the brigade commander has the further responsibility of deciding or ordering how this latter "lay-out" is to be made.

In passing, it may be mentioned that the advent of R/T for R.A. observers will not altogether obviate or alleviate the C.O's troubles, for unless then he organizes his observation and is able to co-ordinate brigade and battery wavelengths with adjacent units, the too numerous sets in any one area will "jamb" one another.

Preparations must be made for the case where an advanced observer will be sent forward with the infantry to surmount a crest as soon as possible after them; he will often be the only man in a position to put the fire of the brigade on the right spot. His possibilities must be foreseen and allowed for more than is generally the case. It is now generally well established that the advanced observer must be a really responsible officer, but there are no accepted rules as to what he should take with him in the way of

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personnel, instruments, cable, etc., etc., and as to how communication from him to the batteries is to be maintained at all costs.

It is recommended that the advanced observer's party be trained for mobile war to work in two echelons, forward and rear, viz. :—the O.C. party must be prepared to work at first probably lying alone in a furrow or concealed in the grass and using a telephone which he has dragged along with him; meantime the rear echelon takes cover or opens up supplementary communication from behind cover. Later, as the advance progresses and better cover for the observer is found, additional members of the rear echelon of the advanced observer's party are drawn forward as required until possibly the post develops into the main observation post of a battery. The constitution of the advanced observer's party therefore requires careful thinking out; its training too is of a very special nature, and should be practised with the infantry at company and battalion training.

As regards the maintenance of communication between the advanced observer and the battery, it has already been suggested that, in freely moving warfare, it may rarely be possible—on account of time, shortage of cable and other reasons—for a brigade to establish more than one or two advanced observers. In either case, however, the question of whether the infantry will obtain the fire of the brigade just when and where they most require it or not at all depends upon the security of the intercommunication between the F.O.O. and the battery.

If therefore a brigade commander has to be very careful as to how he organizes the advanced observer's party, he must be doubly careful to ensure maintenance of communication with it. It is suggested that in each battery, besides an advanced observer's party, an "intercommunication maintenance party" should be organized. Then if one battery sends out an advanced observer for brigade or semi-brigade purposes, an adjacent battery can be ordered to send out its "intercommunication maintenance party," whose duty will be to test and patrol the telephone lines, to supply relay stations if necessary, or even to lay and maintain a duplicate line.

In regard to "training in bringing about a brigade concentration of fire"—there are four general methods by which the fire of the four batteries of a brigade can be brought to bear on a point,

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and the brigade commander has to ensure, by constant practice of his own H.Q. and signal section with all his battery staffs, that each is understood and can be put into action in the shortest possible time. These four methods are:—

1. By the independent registration of each battery using its own O.P. communications.

This method, although probably the most accurate, can only be used when all batteries have telephone lines laid to their O.P's, and it is possible for the target to be indicated to and seen by each B.C. in turn. It is difficult to achieve surprise by this method as a considerable number of ranging rounds are necessary and all batteries have to disclose their positions. Further, there is the possibility of confusion between the fall of rounds unless the times of ranging of the batteries are carefully controlled.

On the other hand, when a brigade has been deployed and batteries have established their O.P's, it is probably the quickest and best method of concentrating fire on an enemy locality which can be seen by all battery O.P's. It is certainly the easiest method from a training point of view.

2. By ranging each battery of the brigade from one "control" O.P.

This method is slow and militates against surprise as well as compromising the brigade communications for a considerable time. Further, the brigade communications must be good. The method, of course, is accurate and the target need only be indicated to the officer at a "control O.P." No special drill is needed, but the selected O.P. must have a clear line to each battery at the time the battery is being registered. It is a method which can be employed in the case of the remaining batteries of the brigade being brought up to reinforce an advanced battery which has established its O.P. communications. It is probably the quickest method when the country is very close, making observation and survey difficult, or when the battery positions have to be well separated.

3. By fixing all batteries of the brigade in a "brigade grid" so that the co-ordinates found by shooting with one battery will serve as a point for prediction of the remaining batteries.

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This method was given considerable prominence during practice camps last year; the system used generally was that evolved by the School of Artillery. This method has the great advantages that surprise can be attained. Only one O.P. is necessary and the traffic down the O.P. line can be reduced to a minimum. Further if the leading battery has already engaged the target, no further registration is necessary. The co-ordinates so found can be used by the remaining batteries as soon as they have been fixed in the brigade grid, and the guns are ready to fire.

Experience last year has emphasized the necessity for the round of "brigade fire" prior to the actual concentration in support of the attack or other movement. However, with further training it seems probable that the round of "brigade fire" could be reduced to the fire of a single gun from each battery at a very short time before zero so that the element of surprise could be retained. The method requires a very high standard of "brigade drill" and of efficiency in communication between the batteries.

Under good conditions the time taken to bring about a concentration by this method will be about 20—30 minutes when all batteries are in action and communications are working well.

4. By batteries fixing themselves from the one-inch map (without waiting for survey) and using the deduced co-ordinates of a registered battery (as in 3) fire being corrected by O.M. corrections.

This is merely a rough and quick variation of 3 and depends for success on an accurate one-inch map and also on the means of getting the lines of fire laid out accurately if these have not already been registered. There seems to be no reason why it should not be successfully employed on many occasions, particularly in the case of close country, which precludes the use of survey owing to the time it would take. The "spread" of the concentration will naturally be far wider than if accurate calculations had been made as to the position of the battery. With the increase of appreciation by all R.A. ranks of the value of carefully fixing positions as accurately as the means will allow it is felt that concentrations under this system—which would only be used in emergency—should not result in a waste of ammunition.

It should be noted that, in respect of methods 2 and 3, in

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order to be in a position to know to which control O.P. he should allot a particular task necessitating a brigade concentration, the brigade commander must know just what can be seen from each of his battery O.P's. He can then detail a control O.P. at any time.

Incidentally this requirement further explains the need for organization of observation by the brigade commanders as already mentioned, but it also means that the brigade must be thoroughly trained in all known means of indicating targets to distant O.P's. In this respect it is thought that as a general rule the panorama sketch, lettered and passed round is probably the easiest method of enabling common reference points to be spotted, but the art of making panorama sketches rapidly and clearly has been very largely lost.

Finally, with regard to "The establishment of a quick, simple and accurate brigade intercommunication drill." At present we have no definite "drill" laid down; it is understood that the School of Artillery is to produce one at no distant date. In the meantime, each brigade commander who wishes to be up to date has to invent one for his brigade; he should try it out with his brigade and battery staffs, and, by trial and error, he will eventually arrive at a "drill" which is foolproof and quick. The great points in producing such a drill and in making it work smoothly are that all "telephone drill" must be perfect, each O.P. must be capable of being switched through on the brigade circuit to all batteries at once, and everyone concerned must understand broadly what it is the C.O. is driving at. It will be seen at once how necessary it is for the brigade commander to interest himself in the "signals lay-out"of his brigade and in the training of all the intercommunication personnel of the brigade. It seems that, as the Regiment progresses in this matter of the brigade control of fire, it will be established that the R.A. intercommunication services have acquired a special technique of their own and that only R.A. personnel will be qualified to form part of these services.

From the foregoing paragraphs regarding the work of the various ranks of R.A. officers to-day, it will probably be agreed that, though the duties of all have changed or are changing—are being raised to a higher level of technical skill and military know-

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ledge—those of a lieut.-colonel commanding a field brigade have changed and increased in every way far more than those of anyone else. In fact, it is patent that if the brigade commander does not function correctly, the brigade will not pull its weight.

At every turn the brigade commander is the busy and important man in the brigade; he must constantly be learning in great detail the situation and its needs, by no means a light task for a man who is responsible for supporting perhaps a mile or more of front; he must be constantly appreciating the situation in the light of the positions of his batteries, the brigade observation facilities, survey conditions and limitations, intercommunication situation, the time available and a hundred other factors. If the brigade is a perfectly trained instrument and its commander has faith in it and it in him, it will answer the helm swiftly and surely and a great weight of fire can be put down at the right time and right place, thus fulfilling the object of the artillery; but otherwise——!

It therefore seems from the above general review that the title of this article, "The New Artillery," is justified. The Regiment is developing with the times and its training and fire application have advanced by leaps; every year produces more advanced ideas which are eagerly snapped up and improved upon by the hosts of very efficient officers who are constantly studying the problems of the gunner. So much is this so—and it would be a poor lookout for any Arm of the Service in which it were not so—and so rapidly will development proceed, that the writer, for one, will be surprised and disappointed if, in 25 years from now, the New Artillery of to-day is not the Old Artillery of that period.

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MEANS OF PROMOTING CLOSER RELATIONS BETWEEN REGULAR ARMY AND TERRITORIAL ARMY UNITS OF THE ROYAL ARTILLERY.

By Martin Gale.

FIRST of all the factors which necessitate this co-operation must be considered: one can then turn to the points which mar the efficacy of this co-operation and suggest possible improvements.

1. *The Functions of the T.A. in case of War.*

In addition to supplying a certain number of Divisions to reinforce the Regular Expeditionary Force after a period of intensive training (say three months in summer or six months in winter), the T.A. forms a basis for expansion into a National Army. These two functions both demand many instructors in the ranks of the T.A. It is expected to expand itself by training its own second, and possibly later a third, line in the case of a great war; this means that perhaps 20% of the strength will be taken away to train and form the second line on mobilization.

To fulfil its primary function the first line unit must receive many recruits and train them in a short time. This may seem a repetition of the preceding paragraph, but the point is stressed purposely in order to bring out the fact that a very large proportion of the peace time T.A. must be potential N.C.O's and instructors. Obviously a few men will never be fit for either role, but can still furnish the nucleus which will help the recruits, arriving on mobilization, to shake down.

The Territorial Army will never produce the required number of instructors unless the great majority of the men are themselves well taught and proficient. It is beyond the capacity of any T.A. adjutant and permanent staff instructor to train their unit to such a high standard unaided. The ideal is for the T.A. officers and N.C.O's to train their own sub-divisions of the unit under the supervision of the regular adjutant and permanent staff instructor. There is a noticeable difference between a unit in which this is done and one where the T.A. officers and N.C.O's give little assist-

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ance in teaching. In the latter case Regular assistance will have to be called in, particularly as regards specialist training, so that the necessary nucleus of T.A. instructors may be trained to impart their knowledge to other men of the unit. The last war, where divisional artilleries were frequently separated from their own Divisions, demonstrated to the regiment the necessity for a common doctrine. All troops, Regular, T.A., Dominion must speak the same language—this is why we have common text books. All can read their books, but a common interpretation can only be disseminated if all concerned mix freely.

The employer has a ready excuse for making difficulties over releasing his men for annual T.A. camps if he can say that the T.A. are only playing at soldiers and that no one takes them seriously. The T.A. likes and deserves to be taken seriously: if Regulars show that they are doing so by helping T.A. units, then employers will be less ready to bring out this old excuse.

2. *Why does co-operation fail in the Regiment and what are the remedies?*

Generally speaking the liaison between T.A. and Regular Artillery units is not as intimate as it might be—or, in fact, as marked as it is in the case of Regular battalions stationed close to their T.A. battalions. The reasons are suggested below.

(a) Different form of esprit de corps.

In the first place it is often forgotten that all gunners go to form the *Regiment*. The Regulars are partly to blame, but, with all due deference, the T.A. are even more so. They have a Territorial esprit de corps which is rather parochial; the 1000th Field Brigade may appear as part of the Royal Artillery in the Army List, but the brigade look upon themselves as the old Blankshire Volunteer Artillery or perhaps the old Blankshire Yeomanry, and are justly proud of the fact.

(b) Desire of the Territorial to keep his identity as such.

The Territorial is also proud of being a *Territorial*. However proud he may be of belonging to the Royal Regiment of Artillery, he is still prouder of the fact that he represents voluntary service in its fullest sense and is definitely identified with local history and interests.

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(c) The Regular is above "County" feeling.

The Regular Gunner, with his disregard for all battle honours, except the one "Ubique", is perhaps not over sympathetic of such esprit de corps. No one understands the word better in its wider sense, but it is only by seeing the Territorial's point of view that he can hope to widen the Territorial outlook. It might promote better relations if there were a little more talk of "the regiment" and less of "the brigade" in T.A. circles. At the same time the Regular should recognize and honour the local esprit de corps of the T.A. Gunners round his own regular station. After all, if the roll of officers in Regular brigades changed as slowly as in the brigades of the T.A. there would be a stronger brigade spirit in the Regulars: the Regular will do well to temper his feelings with this reflection.

(d) Geographical or Territorial Affiliation.

This all goes to show that the Regular Gunner has not got that almost instinctive local esprit de corps, which is possessed by an officer in a Regular battalion: the latter understands his T.A. battalion's county spirit in a way that the gunner, having no Regular unit with its T.A. counterpart, does not. But it has become evident that, however desirable it is for Regular infantry regiments to furnish their T.A. battalions with Regular assistance, economy forbids such a course in many cases. If a south country regiment is stationed in Edinburgh, it can do little for its T.A. units without enormous expense. The Royal Artillery is one regiment and its regimental spirit has not a county inspiration as is the case in some other arms. The gunner is fortunate, therefore, in that affiliation between Territorial and Regular can be geographical without sacrificing any portion of the regimental spirit.

(e) Reluctant help by Regular C.O's.

There is an indication that 1930 will be a T.A. year. Hitherto it must be admitted that a Regular C.O. may have been disinclined to denude his unit in order to help his affiliated T.A. units, if he thought his own training or practice camp would suffer. In a small war it is certain that any expeditionary force will leave behind a nucleus, so that a unit will land in the theatre of war rather short of specialists. "That which is to function in war must function in

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peace"—there lay part of the Regular C.O's excuse. There will be casualties in war of the first magnitude from the outset. The peace time Regular soldier will do well to get used to functioning short handed—as his T.A. brother does year in and year out.

(f) Awkward times for Territorial and Regular.

A unit of the T.A. goes to camp at a time which will suit most of its personnel. This is their big fortnight and must never be an awkward time for the affiliated Regular unit to help them, although it may precede immediately or coincide with part of the Regular unit's practice camp dates. There is the danger that Regular specialists will be allowed to carry on at camp while their T.A. counterparts look on. This is harmful and the man to blame is the C.O of the T.A. unit. A remedy is not to allow Regular specialists to go to practice camps with a T.A. unit: in any case they should not be allowed to assist after the first week in camp—this week being devoted to drill and a gunnery day. Units of the T.A. should not expect help during the second week: it will do them little good to be coached all the time—and an officer of the T.A. seldom makes the same mistake a second time. If the Regular C.O. does go short it must be counted to his credit: a statement of the actual assistance given should be demanded by his superior officer in detail when making up the annual report of that unit: the value of the assistance rendered should be commented on, and the fullest credit given to the Regular unit when it has been deserved.

(g) Reluctant help by individual Regulars.

It must be remembered that T.A. specialists, in order to qualify for proficiency grant, may have to put in more time than the non-specialists. Their scanty leisure hours suffer and they get no extra pay. Article 832, Royal Warrant for Pay, etc., 1926, allows a Regular N.C.O. additional pay for giving up his leisure to instruct these specialists. This reflection should go far to kill resentment if felt by the Regular N.C.O. when asked to give up his Saturday or Sunday to help his brother of the T.A.—who probably has no other leisure time, yet gives it up cheerfully. The Regular might reflect what his feelings would be if he had to spend his annual holiday haymaking or driving a pen. The regiment is about to be

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offered a great chance to kill the cry that the T.A. infantry get more help from the Regulars than the gunners do, for all will be pretty well on the same footing, i.e., a geographical one. The T.A. generally will be turning to the nearest Regulars for help, and the Regulars will have less fear of being penalized if they help the Territorials too much. No system exists for ensuring contact between Regulars and T.A. If they mixed more they would see each other's difficulties and help would be asked for and given in a happier frame of mind. Regular gunner officers would gain much by visiting T.A. units of all arms at annual camps. It is not too much to say that all who went in a critical spirit would return in a somewhat more humble frame of mind. The Army as a whole would benefit. In fact it would be fair to say that no officer reaching a high position in the Regular Army can pull his full weight in helping the T.A. unless he understands its point of view.

(h) Fraternization—or the lack of it.

There is very little mixing in peace stations even when it is easy to do so. It is the mixing, if not the bigger scheme of annual visits to T.A. units for all Regular officers which would do much to raise volunteers for the appointment of adjutant or permanent staff instructor in T.A. units. T.A. C.O's complain of the system which often sends them an unwilling man, who has to be given an extended trial before he can be returned to his unit. Sometimes he makes good, just as sometimes the volunteer only volunteered to have a slack time. It is not only that this mixing would produce more volunteers, but it would give the T.A. C.O. and adjutant a chance of knowing whether the proposed new adjutant or P.S.I. were suitable, in cases where P.S.I's are provided by the Regular unit quartered in the same locality as the T.A. unit. Mixing can be achieved in several ways. Local branches of the Royal Artillery Association often exist side by side for Regulars and T.A. and can co-operate in getting up entertainments, etc. Regular brigades holding sports might consider having a race confined to local Territorial gunners. Serving soldiers may not belong to the British Legion which not infrequently owes its existence to the efforts of serving or former T.A. officers and other ranks. But if Regular officers expressed a wish to become honorary members of the local branch, their example might be followed by Regular

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N.C.O's and an informal means of fraternizing would be created. Attachment of officers of T.A. should aim at giving the T.A. officer interesting instruction and also at giving the T.A. officer a chance of giving the Regular unit some interesting information. For instance a business man, attached to a Regular unit as an officer of the T.A., might be allowed to lecture the men on the demand for employment, and the qualities expected of potential employees in his particular line of business. If the Regular officers are bidden to functions by the local unit of the T.A., they can either refuse politely and stay indoors, or else they can attend with every intention of enjoying a pleasant evening. A Regular officer who goes as a favour to the T.A. unit may soon realize that the T.A. in common with any other host dislikes unwilling guests wholeheartedly.

3. *How to get first-class Regulars for duty with T.A.*

Service as adjutants T.A. must be made more attractive. T.A. adjutants should be specially considered for nominations for the Staff College and should receive the same adjutant's allowances as adjutants in the Regular Army. Since the qualities required by an adjutant T.A. are equal to those of a Regular adjutant, successful service as an adjutant T.A. should be regarded as affording as good a claim to accelerated promotion as does good work in any other appointment connected with the Regiment. Deprivation of servant, groom, horse and two forages was a serious complaint of all Adjutants T.A. This has been partially ameliorated by the recent concession of a permissive grant of a horse, forage and stable allowance, but this was not accompanied by the grant of groom allowance or groom. It is not suggested that the best officers are only found amongst those who are keen horsemen, but many good potential Adjutants will still be missed owing to their inability to afford to employ a groom. In the case of County units appearance in the hunting field is an undoubted asset to the influence of the T.A. Adjutant both personally and professionally.

P.S.I's should be led to expect a greater security of tenure. Constant changes are disliked by P.S.I. and C.O's of T.A. units: as long as a P.S.I. remains up-to-date and efficient he should be allowed to stay with the T.A. unit. Any application for employment as adjutant or P.S.I. with the T.A. should be "vetted" most

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rigorously, and no chances should be taken. It is not too much to make the recommending C.O. personally responsible since the man in the street frequently judges the Regular Army by what he hears from his friends in the T.A. about their Adjutant and P.S.I. It is not a bad ideal to aim at if everything is done to disseminate the idea that the Regulars must be out to help the T.A. if they send such a first-rate man as adjutant or P.S.I. It is worth considering whether ex-T.A. adjutants are not suitable choices for minor appointments with the T.A. such as staff captain of a Division.

4. *Occasional causes of friction.*

It is true that there is an occasional lack of response by the T.A. unit. A Regular adjutant expects to be backed up by his T.A. C.O. within reasonable limits. If Regular officers or N.C.O's give their services they can expect (with all reasonableness) to be made use of and listened to unless they show themselves useless or not worth hearing. When this is the case the Regular C.O. who recommended the individual concerned for employment with the T.A. is often very much to blame: such mistakes do not enhance the T.A's estimate of the Regular Army. The T.A. officer likes to be taken seriously: for this reason he does not resent instructed criticism given in good part. He does resent sarcasm or being laughed at in a malicious way. He is usually ready to admit that the Regular knows more about the job than he does—naturally a whole time soldier should, but the Territorial is quick to resent any air of superiority. The Regular must show he is being cruel to be kind: if he can deliver his criticism in a friendly way, while leaving no ground for supposing that he does not mean to indicate avoidable faults—so much the better.

5. *A connecting link.*

There is one more tentative suggestion for securing fraternization and co-operation and for smoothing down any causes of friction by creating a local fairy godfather wherever Regular and T.A. gunners might come in contact. Regular officers retired and living in a locality could do much to produce a good liaison between Regular garrisons and the local T.A. units. It would be getting on dangerous ground to make them hon. colonels of artillery units

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of T.A., but they could be Colonels-in-Chief of all Regular gunners in a district. This would give them a definite "locus standi" so that they might be well received in attempts to establish the fullest co-operation and to ensure that the Regular gunners intermingle with the local gunners of the T.A. Such officers could do much to allay any hesitation felt by C.O's of T.A. artillery units in asking the local Regulars for assistance: a Territorial C.O. would speak more openly to a Regular officer on half pay who had a permanent home in the neighbourhood.

SUMMARY.

To sum up, the chief fault at present is a lack of fraternization between Regulars and Territorials. The two must understand each other and spend some time together in order to do so. The other faults are mainly due to this lack of understanding. Regular C.O's should be encouraged to send their best men as Adjutants and permanent staff instructors in the T.A.: to denude their own units in order to provide specialist training for territorials before camp, and advice at annual camps (other than practice camps, where the I.G's provide the advice): and to fear no adverse criticism of their own unit owing to having done so. It is most important that Regular C.O's should not be made reluctant to help for fear of the consequences. If this is made quite clear, few times would be found too awkward for a regular C.O. to help his affiliated unit. The best Regular officers and N.C.O's must be offered inducements to go to units of the Territorial Army. The Territorial should cultivate a wider esprit de corps, and the Regular should identify himself heart and soul with the local county feeling. He is jealous of his identity, but the fact that affiliation for all arms in future is likely to be geographical may broaden his views a little. The Regular must show his desire to help with all modesty: the Territorial will meet him more than half way. Both must be sure that they adopt a helpful good-humoured attitude towards each other in all their dealings.

In this way efficiency should increase rapidly, and *The Regiment* have a very definite and honoured place in the hearts of all ranks, whether of the Territorial or Regular Army.

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MUTT AND JEFF AT WAR.

By Major A. H. Burne, D.S.O., R.A.

IT is not generally known that the Army of Ruritania possesses a very up-to-date Artillery. My friends, Mutt and Jeff, despairing of further promotion, have recently transferred their services to the Ruritanian Artillery, Mutt as a Regimental, Jeff as a Staff Officer.

It was over a year since I had seen or heard of them; judge then of my surprise when, edging my way one evening towards a crowded bar, I distinctly overheard, above the babel of tongues, the words "Brigade Concentration," and looking round beheld my old friends engaged in animated conversation . . . .

After the usual salutations Mutt opened with "I hope you don't mind our talking shop. It's done in Ruritania." "Well, what is it all about?" "Why, it's just this—Mutt doesn't believe in brigade concentrations."

"Don't misquote me; I never said that," interrupted Mutt.

The battle was evidently resumed, so I just sipped my drink, and like George Robey, I looked and I listened.

Mutt. Brigade Concentrations may be alright in static warfare. But it's mobile warfare that we have got to train for.

Jeff. But where do you draw the line between the two? Was the Aisne static? Was Ypres? Was Cambrai? Can't you see that almost every big battle contains features of both static and mobile warfare?

Mutt. Yes, but can't *you* see that what governs the situation is not the local condition on the battlefield, but the *Ammunition Supply—that* is the critical point. In mobile warfare you are probably far from your base: your ammunition is strictly limited, and that governs your artillery tactics more than anything else.

Jeff. But that does not affect brigade concentrations because in mobile warfare they take due consideration for scarcity of ammunition and limit the burst of fire to a few rounds per gun.

Mutt. What would you limit it to?

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Jeff. Oh, about 5 to 8 rounds gunfire, 20 seconds. If they fired much more in a burst they'd soon run out of ammunition. 40—50 rounds can do a deal of execution.

Mutt (triumphantly). That is precisely my point. A few rounds will probably do the trick, and in any case you can't afford a large number. Now, leaving out the How. for the moment, let us consider the three 18 pr. batteries of the brigade [the Ruritanian Artillery is armed and organized like ours], of which we will assume that one battery has registered the target. Is it not better that this one batery should fire 15—20 rounds gunfire, five seconds, making use of the quick-firing properties of the gun, rather than use three batteries to fire at a rate that the old 15 pr. B.L. was capable of?.

Jeff. What are your advantages?

Mutt. First—quicker response. The delay involved in getting four G.P.O's simultaneously on the phone is avoided. At practice camp you can rely on their being always near the phone during the comparatively short time that the battery is in action, but in war the battery may be in action all day, and the G.P.O. may be the only officer at the guns. All sorts of duties demand his attention, administrative as well as tactical, which may take him away from the telephone. Now if you use only one battery it will naturally be the one that has registered and can see the target, so no further calculations need be made by this battery. It follows that the fire of this battery will probably be more accurate than that of the other two. Thirdly, and perhaps most important of all, it leaves the other batteries free to engage any sudden target that may crop up while the brigade concentration is being prepared and fired, or to continue tasks that they may be in the middle of. We compute in Ruritania that it takes 20—30 minutes to bring off a brigade concentration. But a lot may happen to alter the situation in that time, and important opportunities may be missed.

Jeff. If there was likelihood of such a thing happening, I agree that it would be preferable to confine the fire to one 18 pr. battery. But the colonel could be judge of that.

Mutt. How can he tell what is happening "the other side of the hill?" It is only guess-work. Wellington said that he had spent his military life guessing that. We had a case the other day

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where an O.P. was surprised by tanks while a brigade concentration was being prepared.

Jeff. But the B.C. should have kept a sharp look-out from his O.P. just the same.

Mutt. No doubt—in theory. But in practice he is obsessed with the job on hand—especially if he has to register the other batteries on to the target.

Jeff. That is all very well, but you forget that generally the calculations are done at the battery end. The B.C. may know nothing about it.

Mutt. As happened the other day on manœuvres, when I spotted a threatening movement round our flank, in the nick of time as I thought. I gave out the fire orders, but nothing happened, and on enquiring the reason I learnt that the battery was getting ready to fire a brigade concentration on another battery's front. When they succeeded in switching me through to the brigade the adjutant was engaged with another battery. In fact all the lines seemed to be in a state of commotion. I put down the phone in despair; my target had by that time disappeared.

Jeff. All that merely goes to show that your telephonists are badly trained. [Here Mutt gave an impulsive wriggle and upset his drink]. I may tell you, our gunnery staff have slaved away at this problem, and unless batteries will back them up, and bring their signallers and survey personnel to a high state of efficiency, naturally good results cannot be obtained. It is of the essence of the matter that the period of "fire immobility" in which batteries are necessarily involved shall be as short as possible. You speak of 20—30 minutes as being the normal time required. But we have done it much quicker than that. Weren't you at that demonstration the other day when a brigade concentration was got off in 12 minutes.

Mutt. Oh, that one where you had all the nobs of the Ruritanian Army to watch? Yes, I was there. I thought it *tragic.*

Jeff (surprised and rather nettled). What do you mean—"tragic"?

Mutt. Simply that it was a tragedy that staff officers and officers of other arms should go away with such a false impression of the capabilities of the artillery. You don't really believe they

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would shoot as well as that in war, yet the spectators have gone back to their own units with great tales about their wonderful artillery. Why, it's even got into the papers; without a hint that what they saw was a 100 per cent. performance, and that they'd be lucky to get 50 per cent. in war.

Jeff. How so?

Mutt. What are the conditions? Picked batteries, specially trained, knowing the ground intimately, programme rehearsed beforehand, good light, short ranges, full strength battery staff and trained up to the minute and on their toes, realizing that they are doing a show turn, officers and men fresh, no induction on the line from infantry cables, no cables cut by A.F.V's, etc., and lastly and most important, no enemy shells or bullets. Did I say 50 per cent in war? I alter it to 30 per cent. All that explains why, when the infantry spectators were looking on in open-mouthed admiration, the gunner spectators round me were sniggering cynically.

Jeff. Now you are being unreasonable. You argue as if war was going to break out to-morrow. We've only been at this thing for a few years, and we're still feeling our way. We don't pretend to have reached finality. You must admit that our batteries are more highly trained than pre-war, and we hope that in a few more years what was achieved at the demonstration will be within the power of every battery in the Army.

Mutt. I'm afraid I don't agree that batteries are more highly trained now—in the sense of being able to get into action quickly and hit any target pointed out to them quickly; I think, on the contrary, they were quicker in the old days. All this "tan theta" business has slowed things up.

Jeff. So you don't believe in survey, or "tan θ" as you call it?

Mutt. Not much.

Jeff. Reactionary!

Mutt (pensively). Now, what exactly is a reactionary? Let's see. Every action has its equal and opposite reaction. If the reaction is inevitable, so must the reactionary be. I suppose it's like the swing of the pendulum. You and I have seen the military pendulum swing a good bit. Every time it starts a fresh swing—that's the reaction. Hence it is begging the question to call a man

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a reactionary, the pendulum is bound to swing back sooner or later; the reactionary will then be in the swim again.

Jeff. An anti-survey man is certainly not in the swim at present!

Mutt (rather bitterly). It must be easier and pleasanter to swim with the tide.

Jeff (warmly). Are you suggesting that we are not sincere in our advocacy of survey?

Mutt. Not in the least. Still less can you suspect a man of insincerity who swims against the tide.

Seeing that the argument was developing into personalities, I restored harmony at the cost of a drink, and Jeff then took up the running.

Jeff. You were hinting just now, Mutt, that the other arms should not come to witness guns shooting at their best. Don't you agree that it is desirable to give the other arms confidence in us?

Mutt. Not if confidence is misleading. It's only human nature to wish the other man to see you in a favourable light. In the old days we did it by surrounding our Regiment with mystery; now we ensure their respect by boosting our survey attainments. We, perhaps unconsciously, lead the infantry to believe that we can swat any old enemy that impedes their path by this new device.

I say that's definitely bad for the infantry: the more they think they can rely on us the more they'll expect and wait for our shells, before going forward, *and they will not always get them.* You know how difficult it was in 1918 when static changed into mobile warfare, to get the infantry to go forward without a barrage? We shall get the same stickiness in the next war unless we're careful.

When a man feels he's only got to pull the communication cord and the guard will come to his help, he is tempted to pull it on the least provocation. We know how frequently the S.O.S. signal was sent up in the war without adequate reason. Tell the men to trust in themselves, and not in anyone behind them.

Jeff. That is tantamount to saying that the different arms should distrust each other. But it is the efficient co-operation of *all* arms that leads to victory, and this cannot arise unless they have mutual confidence.

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Mutt. Confidence founded on a falsehood will soon dissolve in war time. It takes but a very few days' association in war for infantry or cavalry to size up their gunners. If the artillery is efficient the infantry will soon acquire confidence in them—the confidence that they will not hit their own friends, that they will act vigorously, and that they'll get into their target hot and strong if they have the opportunity. But this is very different from encouraging the infantry to believe that whenever and wherever they want shells they'll get them.

Jeff. I agree up to a point. But you must concede that unless we explain the possibilities resulting from survey to the infantry we shall not get from them the information we require in order to make use of it, i.e. where they want fire put down.

Mutt. Are you implying that by means of survey we shall be able to bring fire to bear on spots that we cannot otherwise engage?

Jeff. If you add the word "accurate fire" I do imply it.

Mutt. But fire directed by survey can only be employed against spots visible from the survey points, which in practice means from the O.P's. Now, in the first place, if you can see the spot from your O.P. you can shoot at it more accurately by observed fire than by survey.

Jeff. Wait a bit. Possibly only one battery O.P. can see it. How then can you fire a brigade concentration without survey?

Mutt. That harks back to my original argument that the one battery that can see can take on the job single-handed by utilizing its Q.F. properties. Secondly, the chances are against the spot indicated being visible from the O.P. at all.

Jeff. How do you make that out?

Mutt. Simply because in normal country you will see less than 50 per cent. of the ground in front from your O.P., and further the enemy will endeavour to site his tactical localities on ground which is concealed from your O.P. land.

Jeff. I don't agree with your 50 per cent. of invisible ground.

Mutt. Well, name any O.P. on the Western front where it was more than 50 per cent.

Jeff. I know of at least one; from the top of Mont Kemmel.

Mutt. I happen to know it too, and I wouldn't mind betting that if you make a careful visibility chart from there you would

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find it well under 50 per cent. of the ground within 6000 yards of the O.P. I admit it has the *appearance* of being nearly all visible. But appearances are deceptive. Let me try and draw a diagram to illustrate my meaning. Mutt tore off a drink chit, and on it drew this diagram :—

Only the country shown by thick lines is visible from O.P. The enemy will resist at A, B or C if they have any sense.

Jeff. I certainly have noticed that the ground on which one can site targets at practice camp which shall be visible from the O.P. is extraordinarily limited, but granted what you say is true it does not help your argument any more than mine. *You* won't be able to shoot at A, B or C either.

Mutt. Not from the O.P. But my F.O.O. at D or E will be able to, and your surveyor will hardly be able to set up his instruments there.

Jeff. But that limitation of strict survey work has always been recognized. Remember, the gun itself is no mean surveyor. The F.O.O. by registering his guns can survey in points.

Mutt. But is not that rather begging the question, because under the old regime he would also have registered his guns. It seems to be only a difference in name.

Jeff. The difference is this, that having surveyed the ground by shooting he can put down a brigade concentration on any spot he can see, and in fact register or correct the fire of all the batteries in turn.

Mutt. That'll be pretty slow work, because he probably won't have a telephone up in the front line.

Jeff. You forget R/T.

Mutt. You assume we shall all have it in the next war? Possibly—We don't know when that will be—"Autres temps, autres mœurs." I am arguing on *present* conditions, not on problematical future ones.

Jeff. But you don't seem to realize that R.T. is already a proved success.

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Mutt. A few isolated sets may work well. But how do you know that they will stand the shock of shells bursting near them. Have you tried out that? And how will they behave when every unit carries one about with it? And how do you know the enemy won't jam them?

Jeff. No need for every battery to have one. One set per brigade can control the fire of the whole brigade. That is the beauty of the brigade concentrations.

Mutt. Your argument seems to envisage one definite spot at a time which is the decisive spot. What grounds have you for that assumption? Consider a normal attack on a two-battalion front, each of two companies. Imagine there is a hedge in front of the right company, and the enemy artillery commander decides that this is the chief tactical point, and registers his guns on to it, with a view to a brigade concentration at the appropriate moment. Meanwhile our four companies are advancing in line. The right company sees the registering rounds falling near the hedge, and edges off slightly to its right. The other companies go straight on. The concentration comes down on the hedge, and some of A Company are hit. Meanwhile the other three companies go straight on untouched. Wouldn't our infantry prefer this form of hostile fire to that, say, which the Germans encountered at Le Cateau; when they had only to show themselves in the open to be hit by one battery or another? Under your plan the whole success of our plans depends on the artillery commander making a good guess as to which is the decisive spot. As I say, there may not be one at all: or there may be several simultaneous ones.

Jeff. But you forget the element of surprise. A brigade concentration should not require previous registration. It will generally be directed upon an area, whence great accuracy is not required. The crash of four batteries will obviously be more effective than that of one.

Mutt. Four times as effective? Because it should be so to justify it. In any case this Surprise—the third Principle of War—surely refers to strategical and tactical movements. How can infantry be supposed to be surprised if they are shelled while a battle is raging, especially when they are advancing over ground visible to the hostile artillery? I think they would be rather more surprised if they were NOT shelled!

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Jeff. It is the sudden rapid fire which will be so effective; it will catch them before they have time to go to cover.

Mutt. What cover? This is open warfare, and they are advancing in the open. The only cover they can take is by lying down. They can do this on hearing the approach of the first shell. By the time the second arrives they are all flat. Does it matter to them whether the following 60 shells come in the space of 30 seconds, or are spread out over three minutes? Personally I'd sooner have it all over as quickly as possible. I hate a prolonged bombardment.

Jeff. But in a slow bombardment you would be able to move out of the shelled area.

Mutt. Yes, if the whole brigade were firing by survey. It would be a job to switch the fire of the whole brigade during a concentration, but a single battery could easily switch its fire. In the example I gave you just now, we pictured A Company edging away from the hedge. It would have been difficult to alter the co-ordinates of the brigade concentration at the last minute to allow for this, but it would have presented no difficulty to a single battery using observed fire.

Jeff. I don't see the difficulty of switching all the batteries.

Mutt. Don't you? Well, just listen in on the line when such an order is going through, *under war conditions.* And compare it with the beautiful simplicity of a single battery. In war, *coeteris paribus,* the simplest is the best. *In peace,* we drift further and further away from the simple and the direct. We get more complicated and more academic. We become divorced from the realities of war. Your procedure reminds me of André Maurois' description of the French plan of 1917. "It was a plan without a body, without contact with the solid ground. It all ran too smoothly, like a second-rate novel." [1]

Jeff. What you are saying is scarcely complimentary to the Staff of the Ruritanian Artillery. Our most brilliant staff officers, with unrivalled experience, have been hard at work on this, and are unanimous in its favour.

Mutt. Unrivalled experience of the staff, no doubt. But

[1] "Captains and Kings", by André Maurois.

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how many of them have ever commanded a section or a battery in war?

Jeff. Now you're becoming personal again.

"Have another drink," said I.

Having restored harmony, I set the tambourine a-rolling again by the following question, addressed to Jeff:—"I'm getting muddled by all this verbal sparring. Can you give me simply in a few words the substance of the case for brigade concentrations?

Jeff. I will try. The idea originated, as I understand, with the French, who saw that though one battery normally supports one battalion, it will often be necessary to give a battalion increased support, and all the batteries of the brigade will be called upon together to support first this battalion then that. By means of survey this can be done. The brigade becomes the fire unit, in place of the battery, and its colonel can spray, as it were, with a hose any area he chooses with the formidable fire of four batteries.

Myself (turning to Mutt), and what, also in a few words, is your main answer to that?

Mutt. I will continue the simile. Each of four firemen has a hose (a battery) which he is playing slowly on to his part of a smouldering building. Water (ammunition) is scarce so he only partially opens the nozzle (fires at a slow rate). But when flames break out in his area of the building he at once opens his nozzle to the full (utilizes the Q.F. properties of his gun). In Jeff's fire brigade, instead of one hose fully turned on, all four hoses are switched on to the one spot, each only partially turned on (because of the limited water supply) leaving the rest of the building unattended to.

Myself. I see. So it all hinges on the scarcity of water?

Mutt. Certainly.

Myself. If water was unlimited (trench warfare conditions) you would agree with the methods of Jeff's fire brigade?

Mutt. Yes, if you've got at least two fire brigades at work, so that while one concentrates the other can watch the whole area.

Jeff. So you *do* believe in Brigade concentrations, in certain circs! You said just now you didn't.

Mutt (smiling). Pardon me; I said "Not much," which is not the same thing as "Not at all."

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Myself. You might have an Army brigade superimposed in open warfare. Would you then approve of brigade concentrations?

Mutt. Even then, generally no; because, as I have said, ammunition is limited. It could be employed in an emergency, such as a dangerous massing of the enemy in a hollow, or an obviously decisive attack on a very narrow front. The latter would seldom occur; the former often does, but it can be engaged (and was frequently engaged in the Great War) without any survey work.

Myself. How then?

Mutt. By map shooting. Survey is no longer based on an arbitrary grid, but on a true grid, i.e. *it improves an existing map.* Now what sort of map shall we have in the next war?

Myself. That depends naturally on the sort of country we fight in.

Mutt. And therefore on the enemy we fight against. If he is uncivilized "bow and arrow" methods will suffice against him. But if he is fully civilized we shall expect a civilized map; and we assume a fully civilized enemy in all our training, so we can expect a good map. Now it has been impressed upon us that brigade concentrations will not be at pin-point targets, but areas. Hence great accuracy is not required. Whence it follows that our existing map will be accurate enough.

Jeff. You forget one thing. Apart from accuracy, the map may not show all the local detail—a hedge—a tree—a bank which may conceal a M.G.—that's where survey comes in.

Mutt. The case we are considering is troops massing. They will not mass in the open, but obviously out of sight of your survey points, in a hollow or behind a wood. In this case your survey is no improvement on any map—in fact it is not so good, unless you have gone to the trouble of copying into it all that you can find on the map—and that will take some time.

Jeff. It is no argument against survey to show that in certain circumstances it will not help you.

Mutt. No, but it is as well to realize its limitations. They are considerable. It is not sufficient to say: "In such and such a case survey is useful. Therefore we will adopt it." Whenever a new study is added to our curriculum we have to ask: "By adding this what are we dropping, in order to make room for it?"

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You see, there are only twelve hours in the day, and for every minute added to the study of one subject a minute must be deducted from the study of some other subject.

Myself. That may be true, but it seems rather inimical to progress. Besides, survey does not take up so very much time, does it?

Mutt (ignoring me). Then there's an element of positive *danger* inherent in survey.

Myself. Explain.

Mutt. Because there are so many sources of error. Apart from mistakes in calculation, there are phonetical mistakes. 9 for 5, or 2 for 3—or handwriting mistakes—6 read as 0, 7 read as 1. Such cases have actually happened, and the result might be to put fire amongst our own troops. It is the same danger that is inherent in the artillery code. A single "dot" omitted may cause a tragedy. Such a case once happened at practice, where 4 dots (H) was read as three dots (S), and the consequent switch of 8 degrees pitched the next shell into a village.

Then the rangetaker may make a slip, or his instrument may be out of adjustment, and a concentration fired on the result of silent registration may hit our own people.

These things happen in peacetime: under war conditions, weariness of personnel, casualties to specialists, loss or shortage of the necessary equipment, rain, shells and bullets, will increase the chance of errors. When you think that you are only allowed one trained surveyor in a battery you will realize how slender is the margin of safety.

If you merely lose your log tables you are done!

Jeff. Not a bit. You have a slide rule.

Mutt. And how long do you suppose you'll retain that? Why, in the March retreat one battery hadn't even a single protractor, and I had to lend them one!

Jeff. Ah, but that was in a retreat. In the next war we hope to advance.

Myself (cynically). We always do!

Mutt (continuing). But survey may impose a further handicap. The survey company's co-ordinates may not agree with the map co-ordinates. On a recent occasion there was 300 yards difference. In such cases one spot may be described by two different

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co-ordinates; e.g. the infantry announce their starting line by map co-ordinates. Should the C.R.A's orders alter all these to agree? And who is to compute how much the two differ? In the course of the battle you are told to enfilade a road which is behind the crest, and therefore cannot be surveyed. Will you first copy it from the map on to your artillery board, allowing for the above difference, or will you measure it straight off the map?

And when you locate a M.G. on a spot which is marked on the map will you report it by the map co-ordinates, or go through the process of silent registration, thus computing the co-ordinates? Or thirdly, will you alter the co-ordinates by the amount of the difference, before reporting them?

This is not an imaginary difficulty. I have experienced it myself. Presumably if it is known on all hands that there is an appreciable difference between the map and survey figures one will take care to prefix any co-ordinates by the word "map" or "survey," but the danger will arise *when the difference has not been spotted.*

Jeff. This 300 yards error of yours is very unlikely to recur. The Survey Company is in its infancy and we are justified in expecting better results as time goes on.

Myself. Tell me, Jeff, when do you consider survey is more likely to prove useful, in attack or in defence?

Jeff. On the whole, in defence. Think how useful it would have been at Le Cateau, for example. The Survey Company could have gone back a day ahead and mapped out the whole ground.

Mutt I disagree. They couldn't have got to work till the afternoon and the rain then made visibility bad. Also the actual line taken up was in many cases not the line intended. The frontage of the 4th Division was altered as late as 6.40 p.m. Considering that most of the troops only arrived on the ground during the night and there was still a thick morning mist when the Germans opened the battle, I think it extremely unlikely that survey would have functioned at all. If you read Becke's account of Le Cateau you will see what confusion there was. I cannot see the artillery of the 5th Division coolly working their plane tables, rangetakers and slide-rules under the fire they were subjected to.

Myself. Well, assuming for the sake of argument that it could

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have been done, and *was* done, what effect would that have had on the fire value of our guns?

Jeff. The Colonels could have controlled their batteries better, and concentrated on the important tactical features.

Mutt. There were no "important tactical features," or if there were the Germans ignored them. They simply came on in long thick lines, and when a B.C. saw that he simply let them have it as hot as possible.

Jeff (with a sniff). Very primitive.

Mutt (warmly). Well, if you know of a better way of stopping an almost continuous line ten miles long I should like to hear of it.

Myself. "Steady the Buffs." Now let's take the attack—the battle of the Marne for instance.

Mutt. I'd like to see your survey company map out *that* country in time to be of any use—much too wooded.

Jeff. To tell the truth, the Marne wasn't much of a battle for us. Take the Aisne.

Mutt. There you're getting into trench warfare.

Jeff. Hardly. But if you are, then you must practice for it in peace time.

Myself (looking at watch). Well, I must be going to dress. But I should like to ask Mutt one final question. We have heard the *advantages* for brigade concentrations asserted and disputed. What actual *disadvantages*, if any, can you bring forward?

Mutt. I fancy I have already mentioned them. It comes to this, that by centralization of brigade fire you are giving the brigade commander a new weapon to play about with. and the more he is tempted to do so the more opportunities batteries will miss of hitting their legitimate targets. The other day on manœuvres I was asked to put down three brigade concentrations and register the other batteries of the brigade all within the space of forty minutes. During all that time my battery did not fire an effective round. It and I were much too pre-occupied. Another disadvantage is that the practice of it uses up ammunition which would otherwise be devoted to teaching young officers to shoot *by observation*, which is becoming a lost art.

Beware of over-centralization: it leads to lack of local initiative; that was the downfall of the French artillery at Vion-

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ville. Heaven save us from that fate in the next war! But I fear that is what we are heading for.

The advantages that brigade concentrations give you are at present only problematical, and in any case are quite disproportionate to the time, men, money and material devoted to the study and exercise of them. In short, *le jeu ne vaut pas la chandelle.*

Jeff (with animation). Nevertheless, whatever the limitations, whatever the dangers, whatever the expenditure of time, material or anything else you like, I still hold that it is *really worth while* and that if we do not progress on these lines we shall not progress at all.

Myself. Well, so long! It seems to me that only actual conditions of war which we cannot simulate in peace time will prove whether the game really *is* worth the candle.

So if you buy a new fire-extinguisher which cannot be tested till the fire breaks out, do not reduce the number of your fire buckets.

[Exeunt omnes].

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MOVING WARFARE:
THE ARTILLERY AT ROSSIGNOL, 22nd AUGUST, 1914.

By Colonel A. Grasset, D.S.O.

Translated by Brig.-Genl. W. Evans, C.M.G., D.S.O.

General situation about Rossignol on August 22nd, 1914.

THIS story of the war is intended for gunners, but as artillery is never alone in the field, to make the narrative clear it is necessary to place the artillery in its usual cadre: i.e. divisional and corps artillery.

Let us forget for the moment the gun epaulments, platforms, concrete dug-outs and ammunition dumps that we so conscientiously prepared for the next four years, and carry our thoughts back to moving warfare—"the fresh and joyous war" as we fought it in 1914, and as we may be called on to fight some day in the future.

Our ideas about moving warfare at that time were to prove entirely wrong, though we French just as the British thought we knew all about it. Let us accept that fact without argument, and the more readily when we see that the Germans were just as ignorant as ourselves. Also let us try and learn some lessons from the mistakes made to help us in the future, when in addition we may have to compete with conditions we cannot even imagine to-day.

And so to the story. The evening of August 21st, 1914, found us wandering in the Belgian Ardennes, a wooded country much cut up by ravines. For some days the French cavalry and air force had reported to the High Command a general movement of German troops from the south-east towards the north-east. So much so that General Joffre had come to the conclusion that the enemy's centre in Belgian Luxemburg had been denuded of troops, and had ordered a general offensive from that flank on August 22nd. An offensive to the death: *"The enemy must be attacked wherever he is encountered."*

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The 4th Army was deployed in the region north of Sedan, from Bohan up to Montmédy. It was ordered to cross the R. Semoy and to march due north, through the forest of the Ardennes, with Neufchâteau as a general objective.

There were six corps in the 4th Army: the Colonial Corps, the 9th, 11th, 17th, 12th and 2nd Corps; two Reserve Divisions—the 52nd and 60th; two cavalry divisions—the 4th and 9th.

On the evening of August 21st the Colonial Corps, with the 12th Corps on its left, and the 2nd on its right, was in the area Jamoigne, Gérouville, Margny, Herbeuval, Chauvency. The corps consisted of the 2nd and 3rd Colonial Divisions, and the 5th Colonial Brigade. The 4th Army Order, dated Stenay, August 21st, 18 hours, directed the Corps to move on Neufchâteau in the zone lying between the roads Pin, Suxy, Neufchâteau, on the west and St. Vincent, Rossignol, Neufchâteau on the east. The second division was detached from the corps to be in army reserve and had orders not to pass Jamoigne. The remainder of the corps to push on. *The enemy had no large forces in that area!*

Thereupon General Lefèvre, commanding the Colonial Corps, gave orders for the corps to march northward in two columns on August 22nd: on the left the 5th Brigade via Orval, Jamoigne, Suxy on Neufchâteau; on the right the 3rd Division, cavalry, engineers, the corps artillery and corps headquarter staff, via La Soye, St. Vincent, Rossignol, Les Fossés. He kept at his own disposal the 7th Regiment of Colonial Infantry, belonging to the 3rd Division.

In the other camp, facing the 4th French Army was the Grand Duke of Wurtemburg's *IVth German Army*. It was composed of the *VIIIth Corps;* the *VIIIth Reserve Corps;* the *XVIIIth Corps;* the *XVIIIth Reserve Corps,* the *VIth Corps* and the *3rd Cavalry Division.* Marching uninterruptedly it had reached the line Léglise, Libramont, St. Hubert on the evening of the 21st August, with the advanced guard at Neufchâteau. Up to this point movement had been westward. Orders given on the 21st ordered the Army to move south to keep touch with the *Vth Army* on its right who were attacking Ethe and Virton in that direction.

The *VIth Corps* with whom we are concerned halted on the evening of August 21st; the *11th Division* at Thibessart and Mellier;

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and the *12th* at Léglise, Bernemont, Habaru, and Neufchâteau. In accordance with army orders General von Prietzelwitz, the *VIth Corps* commander ordered his two divisions to be ready to march at *6 hours*,[1] August 22nd: the *11th Division* on Tintigny via Marbehan; the *12th Division* towards Rossignol.

The result of these orders, and their individual interpretation, was that the 3rd Colonial Division came up against the *12th Division* in front of the forest of Neufchâteau, and its right flank encountered half the *11th Division* about Tintigny, Ferme du Chenois, St. Vincent.

It should be mentioned that on the evening of August 21st a violent storm was raging over the whole of this district, and that French and Germans alike, badly sheltered in bivouac or unable to find sufficent billeting accommodation, were soaked and suffered from the cold during the foggy night 21—22. This shows that in war instead of grumbling at bad weather the soldier should always remember that when he is rained on, the enemy is out in it too, and perhaps is even more uncomfortable than he himself is. There is a good deal of comfort in this reasoning!

The March orders:

(a) The 3rd French Colonial Division.

The 3rd Colonial Division was composed of the 1st and 2nd Colonial Regiments forming General Montignault's 1st Brigade; the 3rd and 7th Regiments forming General Rondony's 3rd Brigade; the 2nd Regiment of Colonial Artillery with three groupes each of three four-gun batteries; a company of engineers and a squadron of (reserve) dragoons. The Corps Artillery—the 3rd Regiment of Colonial Artillery which was to march with the 3rd Division was without its 1st groupe, detached to the 5th Brigade. It therefore only had the 2nd, 3rd and 4th groupes each of three four-gun batteries. The 3rd Regiment of Chasseurs d'Afrique also was to march with the 3rd Division. It was not to reconnoitre for the column and disappeared from the battlefield at 10 hours.

[1] German time is an hour in advance of French. In this article French time is used for both armies.

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General Raffenel, the divisional commander, sent out his march order at 1 o'clock in the morning. It was as follows:

Advanced guard.	1 squadron 6th Dragoons.
(Gen. Montignault.)	1 regiment colonial infantry
	1 battery.
	1500 metres distance.
Main body.	2nd Regiment colonial infantry.
(Gen. Rondony.)	1 company engineers.
	Divnl. Artillery (3 groupes less 1 battery)
	3rd Regiment colonial infantry.
	7th ,, ,, ,,
	Corps Artillery (3 groupes) (to cross La Soye from 7 hrs. to 7.30).
	First line transport.

Route: St Vincent, Mesnil Breuvanne, Rossignol, Les Fossés, Neufchâteau. The head of the advance guard to cross the bridge at Mesnil-Breuvanne at 6 hrs. 30.

(b) *The 12th (German) Division.*

The *12th Division* was composed as follows: the *63rd* and *157th Regiments* of infantry forming General Vollbrecht's *78th Brigade;* the *23rd* and *62nd,* General von der Heyde's *24th Brigade;* the *2nd Uhlans;* the *12th Artillery Brigade,* comprising the *21st* and *57th Regiments* of field artillery (each having two groupes of three six-gun batteries); and two companies of engineers.

Troops were to be ready to move at 6 hours on August 22nd On the evening of August 21st General Charles de Beaulieu, the divisional commander, issued his march order:

Advanced guard.	*2nd Uhlans.*
(Gen. Vollbrecht.)	*157th Regiment* infantry.
	1 groupe *57th Regiment Field Artillery.*
	1 company engineers.
Main body.	*63rd Regiment* infantry.
	2nd groupe *57th Regiment Field Artillery*
	24th Bde. with *21st Regiment Field Arty.*
	1 company engineers.

At 3 hours 30 (French time) the division received the order to

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be ready by 5 hours disposed as follows: head of the advanced guard at the cross roads south-west of Les Fossés; the main body on the Neufchâteau road ready to follow the advanced guard at 1 kilo. distance.

(c) *11th (German) Division.*

The *11th Grenadier Regiment* and *51st Infantry Regiment* forming Colonel Seydel's *22nd Brigade;* the *10th Grenadiers* and the *38th Infantry Regiment* forming Colonel von Kleinschmitt's *21st Brigade; 11th Regiment Dragoons; 11th Artillery Brigade* (Brig.-Gen. von Bischoffshausen) comprising the *6th* (Colonel von Zglinicki) and *42nd Regiments* Field Artillery (Lt.-Colonel von Heimburg), each of two groupes of three six-gun batteries. 1 company engineers.

Here also a march order was issued in the evening of 21st:

Advanced guard. (Colonel von Kleinschmitt.)	*1 squadron cavalry.* *11th Grenadiers.* *1 groupe 6th Regiment Field Artillery.*
Main body.	2nd Battalion *38th Infantry Regiment.* 2 groupes *6th Regiment Field Artillery.* *42nd Regiment Field Artillery.* Remainder of *38th Infantry Regiment* (a company between each artillery groupe). *22nd Brigade.* 1 company engineers. 3rd groupe of *6th Regiment Heavy Artillery* (from the Corps).

This formation to be adopted on passing crossroads 410, 2 km. north of Marbehan.

On August 22nd at 4 hours the order was received to march on Marbehan.

Now that we have fitted them in with the other troops, we will proceed to follow the movements of the artillery.

THE COMMENCEMENT OF THE MOVEMENT AND THE ENCOUNTER.

A. French.

(a) The 2nd Regiment of Artillery (3rd Divisional Artillery).

The 2nd Regiment of Artillery arrived at Gérouville at mid-

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night of 21st and 22nd. It had been raining; a thick fog now prevailed. The men had to settle into bivouac in the pitch dark night by the light of lanterns. The guns were parked by hand one behind the other; the miserable soaked horses picketted and the gunners packed in as best they could into hay barns. There was nothing to eat except biscuit and preserves. Fortunately the inhabitants offered them some coffee, but the horses had to go on short rations.

At 4 hrs. 30 Colonel Guichard Montguers got orders from the Division. One battery to the advanced guard to be up to the Semoy at the Mesnil Breuvanne bridge by 6 hrs. 30.

From Gérouville to this bridge is 9 kilometres. The men would have had less than three hours sleep . . . . it could not be helped. Stand to at once and move off at 5 hrs. 30. Auclin's battery (4th) to go to the advanced guard. Order of march: Lotte's groupe (1st) in front, next Cherrier's groupe (2nd) less Auclin's battery; next Pétit's groupe.

At 5 hrs. 30 the batteries were on the move. The column of route of the 3rd Division was formed, as laid down in the order, along the road.

At 6 hrs. 30 the advanced guard was at the Mesnil bridge. The head of the main body was in St. Vincent. A halt to await the withdrawal of the outposts.

The men stamped on the ground and walked about to try to get warm for the fog made it cold. Some munched biscuits, others smoked. The steaming horses slept on three legs, with lowered heads. Security was absolute . . . . the enemy at least 50 km. away. The halt continued. The villagers at their doors chatted to the men: "Germans? There were plenty over there yesterday," they said, pointing northwards. "The forest is full of them." They had seen them everywhere. How odd! one reassured them and laughed at their fears.

In any case the divisions, supported by others on either flank, were quite safe. Billets to be at Neufchâteau with the artillery at Les Fossés. We should soon be in billets.

Get mounted! We start. To save time the main body moved by the cross road from the Ferme du Chenois.

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The advanced guard had crossed the bridge over the Semoy. The road was good and was bordered by trees. West of the road ran a stream, almost touching it in places; it was the Prés Thibeaux rivulet flowing west from Rossignol; impassable for artillery on account of its muddy banks. The country was slightly undulating; the crops were still standing and were very high; wire fences separated nearly all the fields. From Rossignol as you passed through you could see the edge of the forest forming as it were the circumference of a circle, with the village as centre and radii ranging from 1500 to 2000 metres.

Here too the villagers were uneasy—"Still lots of Germans, I suppose?" "Lord, yes, they are there right enough . . . ." One laughed and passed on. The advanced guard disappeared in the wood, behind the squadron of dragoons, who drove back a few Uhlans.

We had not been in the forest ten minutes, in fact the whole of the advanced guard had not entered when rifle fire broke out. Wounded cavalrymen came back and said the enemy were there in force.

The 1st Colonial Regiment deployed by battalions. Auclin's battery, whose last vehicle had not yet entered the wood, was halted on the road.

General Raffenel, the divisional commander, was at the edge. Hearing the fusillade which was becoming more and more violent and appeared to be spreading east and west, he halted the main body of the Division.

The 2nd Colonial Regiment had just cleared Rossignol. The head of Lotte's (1st) groupe had just reached the southern outskirts of the village; Pétit's (3rd) groupe was about to cross the Semoy.

The halt lengthened. The firing increased in volume, the rattle of machine guns could be heard and an aeroplane marked with the black cross flew over the column.

It was now 8 hrs. 30. A hurricane of shell began to fall on the 3rd groupe batteries who were still south of the Semoy. The fire appeared to be coming from the direction of Harinsart, though neither batteries nor troops could be seen there. Major Pétit sent his adjutant, Lt. Balaye, to report this extraordinary happening to the General. At that moment the shelling stopped.

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Lt. Balaye started to return at 9 hours. He had made his report to General Rondony who greeted him with ironic scepticism: "You too, my dear comrade. You are letting the Belgians' tales get on your nerves. You really ought to know better!" And the General ordered the groupe Pétit to cross the Semoy and push on towards Rossignol.

In the forest the fighting was intense. Wounded men coming back said the enemy were very strong. Lieut.-Colonel Vitard of the 1st Regiment appeared, his hands torn and bleeding. Colonel Guichard Montguers went up to him. He had known him a long time and seen him in action and could testify to his gallantry and sound judgment. Colonel Vitard was most pessimistic; to the questions put to him he replied: "They are numerous and dug-in. You can send as many infantry as you like. They won't be able to get on."

From this Colonel Guichard Montguers decided that the artillery ought to be got into action to support the infantry if it should be driven out of the forest. He asked for the General's sanction to this, and he agreed.

(b) The 3rd Regiment of Artillery (Corps Artillery).

This regiment was billetted at Chauvency le Château.

At 4 hours the order came to move. It was to follow the 3rd Division and to reach La Soye by 7 hrs. 30. About 17 kilometres—roads bad, through woods and defiles. This meant starting at 4 hrs. 30, in half an hour's time. Luckily the gunners were already up and about, whistling and singing, while they shaved, groomed their horses, wiped over their harness and got coffee ready.

No infantry. But no cause for alarm to-day. The enemy were 50 kilometres away.

They started. As is usual the scouts of the 2nd groupe filed off in front onto the road in column. The colonel followed wrapped up in his cloak and talking about literature to Lt.-Colonel Jaquet and the four officers of his headquarter staff. The groupes moved off: Amman's 2nd groupe leading; then Pétit (3rd) and last Peltier (4th). The fog still prevailed, a thick cold mist which had made the night very unpleasant, but now had the advantage of concealing the movements of the column from hostile aero-

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planes. La Soye was reached exactly at 7 hrs. 30 via Thonne le Thil and Breux without incident.

The 7th Regiment was there and a battalion was detailed as escort to the artillery. It was split up amongst the groupes: a company in front, a company between each groupe and a company in rear. While this was going on the scouts, to amuse themselves, went through the neighbouring copses . . . . and brought back in triumph a couple of Uhlans. Everyone was eaten up with curiosity but only attributed their presence there to the fact that they had probably lost their way . . . . And the march was gaily resumed.

B. German.

I. *The 12th Division.* Things were much the same here as with the French. Only vague information as to the enemy. The French believed to be in strength near Grandvoir, west of Neufchâteau, but none had yet been reported from the south.

(a) The *21st Regiment Artillery* was split up. The *1st groupe* was at Neufchâteau and with the *23rd Infantry Regiment* formed Hoffmann's mixed detachment, placed there to act as flank guard. Lieut.-Colonel Schmitt Köppen, regimental commander, only had with him at Bernimont his *2nd groupe,* who were bivouacked in great discomfort in the rain. Moreover, they had counted too much on the country for provisions, and the inhabitants, who had seen troops passing by for the last week, had hidden their last reserves, and so on this night the men had to be content with biscuit and preserves. As they had to be ready to move at 6 hours, they were roused at 3 hrs. 30 in the icy fog; and grumbling, the men silently got ready by the light of lanterns.

At 5 hours the groupe from Bernimont was on the move, as the divisional column was to start from the cross roads south-west of Les Fossés.

(b) The *57th Regiment Artillery* was also in bivouac. The *1st groupe* at Lavaux with the *157th Infantry Regiment;* the *2nd groupe* at Nivelet with the 63rd. The gunners had found some barns with straw and had obtained quite good provisions from the inhabitants. Briefly they seem to have had good rest, and slept till 5 hours when the stand to was ordered.

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At 6 hrs. 30 they moved. At 7 hours they were waiting at the cross roads west of Les Fossés for the infantry to get into their places in the column forming up in the fog which was still thick. The *1st groupe* of the *57th* joined the advanced guard. The *2nd groupe 57th* was with the main body followed by the *2nd groupe* of the *21st*. The 3rd Battalion *62nd Infantry Regiment* interspersed its companies between the groupes.

The *1st groupe* of the *21st* was not yet there. It was to follow on in rear of the column with the *23rd Infantry Regiment* which Lt.-Colonel Hoffmann was bringing from Neufchâteau via Assenois.

At 7 hrs. 30 en route towards Rossignol. Still no information regarding the enemy as the forest of Neufchâteau was impenetrable by cavalry. The *1st Regiment Uhlans* in fact was ordered to let the infantry pass through leaving one squadron only to guide the column; the remainder to form up in rear.

Hardly had the advanced guard entered the forest, when firing was heard. Some wounded Uhlans came back. The wood was held. The *157th* with the advance guard deployed its three battalions in succession. The *1st groupe 57th* halted . . . . the enemy held their ground.

At 8 hrs. 30 the Divisional Commander ordered Colonel Zollern commanding the *63rd Infantry Regiment* to march on Termes, by way of 405 with his regiment accompanied by the *2nd groupe 57th Artillery* and a company of engineers.

He ordered the *157th* to push the attack vigorously and at all costs to reach the southern edge of the forest, as that was essential if any use was to be made of the artillery.

II. *With the 11th Division.*

The two artillery regiments of the division were in very cramped quarters: the *6th Regiment* in Thibessart; the *42nd* just outside on both sides of the road to Mellier. The conditions not good, specially for the *42nd* who had to sleep out in the rain.

At 4 hrs. 45 stand to and instructions to march on Tintigny via Marbehan. Of the enemy only vague information . . . .
At 5 hrs. 30 departure of advanced guard of which the *1st groupe 6th Regiment* formed part.

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At 6 hrs. the main body moved off, the *2nd groupe* of the *6th Regiment* leading the artillery, followed by the *1st and 2nd groupes* of the *42nd.*

The advanced guard had left Marbehan when the cavalry reported strong French columns on the roads south of the Semoy. Orsainfaing probably occupied by the enemy. It was now 7 hours. Colonel von Kleinschmitt, commanding the advanced guard, at once sent the *1st battery* of the advanced guard groupe to a hillock west of the road and 1 km. south of Marbehan to remain in observation. General von Webern, foreseeing an action, sent the *2nd groupe 6th Regiment Artillery* up to reinforce the advanced guard.

At 8 hours the advanced guard passed Harinsart. Orsainfaing was patrolled and found clear but a strong French column was reported on the Mesnil-Breuvanne—Rossignol road. Colonel von Kleinschmitt sent the *2nd* and *3rd* batteries of the *1st groupe 6th Regiment artillery* to the hillock 345 1 km. south-west of Harinsart with a company of the *10th Grenadiers* as escort. The fog had not entirely lifted, but visibility was fair. Fire was opened between 2600 to 3000 metres on the column south of Mesnil-Breuvanne.

The *1st battery* which had remained south of Marbehan was ordered to join the two others at 345.

General von Webern, informed of these movements, reinforced the advanced guard with the *1st groupe* of the *42nd Regiment Artillery*. The march proceeded.

THE BATTLE.

(A) From north of the Semoy—Rossignol.

(a) With the French.

Colonel Guichard Monguers left with the personnel of Lotte's (1st) groupe to reconnoitre the road towards Termes. Lt.-Colonel Schultze, an old schoolfellow who came up for information, said to him as he went off: "You know they've been firing on us . . ." He was alluding to the shelling of Pétit's groupe at the Breuvanne bridge. The colonel thought he was alluding to the fears of the Belgians, did not stay long to ask questions, and rode off.

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The ridge 353-363 formed an excellent position commanding the exits from the forest. It had to be approached from the Termes road as the stream was not fordable. But as it seemed unlikely that artillery would need it, one battery only was detailed to occupy a position in observation.

Prot's 1st Battery was therefore installed on the hillock 353 north-west of Rossignol. Returning to the road the colonel was getting ready to lead Cherrier's groupe reconnaissance party eastwards, when Captain Puel pointed out guns apparently coming into action at 363, 1000 metres to the west . . . . he thought they were the enemy's. "Oh come ! . . ." Field glasses were directed in that direction . . . . they undoubtedly were "field-greys" getting ready to open fire.

Puel's battery was in column of route. The captain ordered "action left" and quite calmly the drivers unhooked and cleared the teams off the road : gunners unlimbered and laid for direction and in three minutes fire was opened at 1000 yards with percussion shrapnel. In the sunshine, which by now was bright, one could see a thick cloud of dust crown the hillock, from the midst of which men and terrified horses rushed about in confusion. The battery was absolutely annihilated.

But about 10 hours, shells began falling from the east. Was there nothing then on the flanks of the Division? . . . . Whence came these shots? It seemed a nightmare. Major Cherrier, who had gone with the 2nd groupe staff to reconnoitre for positions on the ridge 345-343 reported that bullets and shell were falling thick and that it was impossible to get guns there owing to the marshy ground.

They had perforce to remain on the road. The Colonel ordered the groupes : Lotte (1st), Prot's 1st battery to cover the edge of the forest west of Rossignol; Puel (2) and Noir (3) in action on the road to look after the left flank of the division. Cherrier (2nd) facing north-west and east to look after the right flank of the division and the edge of the forest east of Rossignol. Pétit (3rd) from hill 339 to endeavour to counter-batter the invisible hostile artillery firing from the east, and eventually to cover the retirement of the other two groupes.

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In fact, he had to be prepared to fire north, east and west and could not leave the road. No one could understand what had happened. The artillery were excellent soldiers, and their *moral* high, but all the same at 11 hours, shelled from east, south-east and west, they could not help feeling that their situation was, to say the least, abnormal.

The battery commanders of Pétit's groupe fired on points they considered likely towards Orsainfaing, Ansart, Tintigny, but this was really as a salve to their consciences and to keep the mens' nerves steady, as they could see nothing. Major Pétit was furious. "We are fighting the 2nd Corps" he kept saying.

Suddenly more guns were seen coming up on hill 363 to the west. Captain Germain opened on this target at 1500 metres. In the height of the series Pétit ran up. "Cease fire at once. You are now shooting at the 12th Corps . . . ."

From midday on casualties became terrible and it was impossible for batteries to stay where they were without risk of being annihilated by bullets and shell fire. They tried to carry on their task by grouping themselves on hill 339 and digging in.

In Cherrier's (2nd) groupe: Duhautois' (3rd) battery on the north slope covered the high ground east of Rossignol; Auclin's (4th) on the south slope, covered the crest Rossignol—Termes; Flachot (22nd) on the south-west slope looked after the high ground to the east.

In Pétit's groupe (3rd) Gallin's (5th) Battery on the north-west slopes also shot east. Papelain's (6th) Battery on the north slope facing right about observed the bridge of Mesnil-Breuvanne where rumour had it the enemy had arrived! . . . . Germain's battery down below the north-west slopes always kept on point 363.

These gallant men were ready to make all reasonable sacrifices, but at 13 hours, feeling the pincers were closing round Rossignol, Colonel Guichard Monguers went to the General. He pointed out the situation of the artillery fired on from all sides and unable to get into action. He asked leave to take his regiment south of the Semoy, where at any rate, although 6000 metres from the line he would be better able to act.

"No!" said General Raffenel, "we must hold Rossignol at all

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costs. Reinforcements are coming. There is no question of retiring."

At 14 hours the wreckage of the 1st and 2nd Colonial Infantry regiments having evacuated the forest, the German infantry occupied the edge of the wood, and extending widely turned machine guns onto Prot's (1st) battery on 353 taking him in enfilade. Colonel Guichard Monguers ordered this battery to evacuate its dangerous position and to come back onto the road at the southern exit of Rossignol and cover the ground towards Orsainfaing. About this time Duhautois's (3rd) battery on hill 339 shelled from behind by guns firing from Tintigny had had to come back onto the road and was doing nothing. This battery he ordered to the northern exit of the village. But Rossignol was blocked with the vehicles, corpses of men and horses of the 1st and 2nd Regiments and Duhautois' battery did not succeed in getting to the north edge. Only two guns—Lt. Psichari's—succeeded in getting there and at once opened fire on the edge of the wood. Now ammunition began to run short, and we heard that after 11 hours the bridge at Mesnil-Breuvanne, blocked by vehicles and corpses, was impassable owing to the hostile fire and that no more ammunition could be got up.

From now onwards the story becomes tragically monotonous. The batteries were shut up all along the road from Breuvanne to Rossignol, short of ammunition, without infantry support, dominated from the east and south by heights occupied by the enemy's infantry, machine guns and artillery. They moved a few yards from time to time to avoid the worst of the shelling, and their guns were pointing in all directions.

After 15 hours the few rounds left had to be eked out to engage lines of riflemen coming from the east and west.

At 18 hours Rossignol, now a shambles and with the houses on fire, was taken by the enemy.

Colonel Guichard Monguers was wounded. Major Cherrier and two or three officers per battery were dead or wounded. Nearly all the horses were killed. The drivers, after having made much of them, shot the few that remained alive and then such of the drivers and gunners as were capable manned the ditches by the road and used their carbines. The guns—run out of ammunition—were disabled and abandoned. A tragic death agony for a

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fine regiment stretched along the road on which it was marching to billets! At 19 hours the German infantry arrived from the north, east, west, south . . . . and all was over.

(b) With the Germans.

The *12th Division.* The *1st groupe* of the *57th Field Artillery Regiment* was halted in column in the forest waiting for the infantry to be clear of the road. Behind them were squeezed the two groupes of the *21st Field Artillery Regiment,* and while all the infantry units of the division were successively becoming engaged, the artillery remained there with their escort of an Uhlan regiment. Towards midday, however, the exhausted infantry demanded artillery support. At all costs.

The teams were taken out of two guns of the *1st battery* which was at the head of the column and they were dragged by the detachments down the rides to within a few yards of the edge of the wood.

Two more guns from the same battery followed a few moments later and at 12 hrs. 30 fire was opened on Rossignol.

About 15 hours the French troops who had been holding the crest 300 metres from the edge of the forest had to abandon this position and General Zietlov, the artillery commander, at once gave the following orders:

1st groupe 57th to come into action 300 yards south of the edge, west of the road.

Both *groupes 21st* to come into action east of the road.

The *1st groupe 57th* had no difficulty in getting into action, but it was not so easy for the *21st* as some of the enemy were still left on the crest of Chapelle Savlon and the boggy ground made movement very difficult. The *1st groupe* managed to get into action, but the *2nd groupe* had to remain on the road in the forest until 16 hours—when the enemy had been completely driven back on Rossignol.

Then the *2nd groupe* of the *21st* came and took over the position of the *1st* and Lt.-Colonel Schmitt Köppen pushed forward his *1st groupe.* Two batteries to near Chapelle Savlon, the rest astride the Orsainfaing—Rossignol road 500 metres east of the crest 365.

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From there, 1000 metres from the outskirts of Rossignol, this groupe smothered the village with incendiary shell.

The *2nd groupe 57th* who had started towards Termes through the forest with the Zollern detachment was not so fortunate. Towards 11 hours it came into action on hill 363 north-east of Termes, when the left battery, the *6th,* came under terrific artillery fire coming from the east. In less than five minutes this battery lost seven officers, eighty men, eight horses and had three guns and one wagon entirely destroyed. It remained there useless for the rest of the day.

The *4th* and *5th batteries* were able to do good work engaging hostile troops to be seen north of St. Vincent.

That night when the fight had died down the groupe joined up with the rest of the artillery brigade in bivouac on both sides of the Rossignol—Les Bulles road.

B. From south of the Semoy—St. Vincent.

(a) With the French.

At 9 hours the 3rd Field Artillery Regiment was leaving the wood when Colonel Lenfant received from the Corps a verbal order to pass the infantry and proceed to Rossignol at a trot.

At St. Vincent they turned north to take the Tintigny—Les Bulles road. At that point was a large crowd of men, horses, bicycles and cars . . . . Towards the north the gunfire was incessant. The Colonel who was trotting at the head of his column galloped on and demanded right of way. But finding the Corps Commander and his staff he went up and asked for information as to the situation: "My friend, said the General, we know no more than you do."

At that moment shell were bursting north-east over the plateau on which lies the Ferme du Chenois so the Colonel collected his majors to reconnoitre the ground in that direction. It was impossible to go into action there, so many shell were falling. Amman's groupe managed to squeeze between the Tintigny road and the Breuvanne rivulet. The other groupes must find positions further back. Besides a staff officer brought orders to the Colonel to occupy the crest 381—392—396.

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At 11 hrs. 30 the three groupes were in action:

Amman (2nd) north of the Tintigny road.
Pétit (3rd) hill 392.
Peltier (4th) hill 395, south-east of St. Vincent.

No information to hand. A strong enemy attack had developed from Tintigny on the Ferme du Chenois. They appeared to be getting round the flank towards the east through the woods. The 7th Colonial Infantry Regiment which had suffered terrible casualties had all its units engaged, and from 13 hours was falling back on St. Vincent and endeavoured to rally there. The 3rd Colonial Regiment which was trying to push on to Rossignol was deployed south of the Semoy in the meadows west of Mesnil and was under heavy gun and rifle fire from Termes and from hill 363. No infantry was available to support the corps artillery who at 13 hours became seriously compromised.

The groupe Amman (2nd), crippled by rifle fire, had to be withdrawn to the northern corner of the big wood west of St. Vincent.

Petit's (3rd) and Peltier's (4th) groupes took part in the fighting north-east but the nature of the ground—hummocky and covered with copses—made targets very difficult to find and the gunners felt that they were not doing much good.

Colonel Lenfant had established his command post in the edge of a small wood 400 metres north-west of St. Vincent. He remained there without news or orders as no runner could get through to him owing to the intensity of the fire.

Towards 14 hours the 7th Colonial Regiment, driven back by a complete brigade of the enemy, had to abandon St. Vincent and began to fall back on the woods south-west. It was necessary to withdraw the artillery to avoid its capture. Colonel Lenfant gave orders for the retirement.

The manœuvre was carried out with comparatively few losses, although under infantry fire. At 15 hrs. 30 the leading batteries reached the edge of the wood near the station. The 7th Colonials were then ready to put up a resistance.

The enemy did not pass St. Vincent. At 16 hours the three groupes of the Corps Artillery reorganized at La Soye.

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(b) With the Germans.

At 9 hours we left the *11th Division* marching on Tintigny. The *1st groupe* of the *6th Field Artillery Regiment* was in action on hill 345, 1000 metres south-west of Harinsart; there remained still with the advanced guard the *2nd groupe* of the *6th* and the *1st groupe 42nd.*

At 9 hrs. 20 considerable hostile columns having been reported on the road between Rossignol and Mesnil and also on the south bank of the Semoy, the *2nd groupe 6th* was also brought into action 500 metres south of Harinsart. It had as escort the 1st Co., *10th Grenadiers*, and the march continued. The groupe occupied positions in echelon facing south-west and opened on the targets already fired on by the *1st groupe.*

At 10 hrs. 30 the *1st* and *2nd groupes* were limbered up and marched on Tintigny which the *21st Brigade* had traversed unopposed. In this village the *11th Division* was split up. The *21st Brigade* proceeded with the *42nd Field Artillery Regiment* southward towards Bellefontaine, and concern us no more. The *22nd Brigade* turning westwards had as objectives the Ferme de Chenois and St. Vincent where important French forces were reported to be. At 11 hrs. 30 the six battalions of the *11th Grenadiers* and *51st Infantry Regiment* commenced to attack in that direction.

The *6th Regiment Artillery* pushed forward to their support. But just as the head of the column was approaching Tintigny rifle fire broke out in this locality. Some surprised French patrol perhaps, or possibly franc-tireurs. Lt.-Colonel von Zglinicki, commanding the Regiment, ran to the leading battery, the *1st*, and brought it into action in a meadow between the Semoy and the road. The battery opened fire from there on Tintigny at 500 metres and set most of the houses on fire. Bad tactics as it prevented the batteries passing through the village for some time.

At 12 hrs. 10 the *1st groupe* came into action on hill 343 southwest of Ansart and opened at 2000 metres on strong bodies of all arms that they could see around Mesnil and the Ferme du Chenois.

The effect of this fire was so good that Colonel Zglinicki brought up the *2nd groupe* also to this position.

The latter came into action at 13 hours on the right and in

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front of the *1st groupe*, in a shallow dip 1000 metres north-east of Breuvanne.

But from this position the *2nd groupe* had a better view towards the north than towards the south, and so devoted its attention to this direction, more particularly to Rossignol whose defenders were holding up the *12th Division.*

Suddenly an organized French attack developed from the eastern edge of Rossignol, strength about a battalion, having apparently Orsainfaing as objective. This movement would have cut off the retreat of the *11th Division.*

It was 16 hours. Heavy fire was brought to bear on these troops and broke them up. One party went back into Rossignol another in disorder and shelled all the time disappeared towards the east.

At 18 hrs. 30 the fight was over. Without waiting for orders Colonel Zglinicki took his two groupes south of Han.

CONCLUSIONS.

It is obvious that in future the tactics of Rossignol, so similar to those of 1870, will not be repeated. Nevertheless there are many lessons to be learnt from what happened there on August 22nd, 1914.

1. Both artilleries, French and German, marched in column of route in broad daylight! What an opportunity for aeroplanes if they had known how to profit from it. In future marches the procedure must be altered. Except in wooded country or in a fog artillery must never remain in column during the day. It must march by night with a proper escort.

2. The French artillery crossed the Semoy, a serious obstacle, and entered the basin of Rossignol without knowing if the Forest of Neufchâteau was clear of the enemy. This though two cavalry divisions had been fighting in this region for a week, and the inhabitants were very positive in their statements. This was blind folly, more due to psychology than want of training.

The Germans on the other hand knew the enemy were there and yet allowed all their artillery to enter the forest without knowing how to get through or how to get back—an equally bad fault.

What should have been done? As far as the French are con-

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cerned, the artillery should have occupied the heights south of the Semoy and waited until the infantry with a few guns of accompaniment had occupied the northern edge of Neufchâteau Forest.

Equally the German artillery should have occupied the heights of Léglise and waited till their infantry was in possession of the southern edge of the forest.

The two infantries would have met under cover and instead of butchering each other and suffering terrible losses, would have had the opportunity to manœuvre. The most clever would have drawn the enemy towards their own artillery, to the outside of the wood, and would have found there a battlefield already prepared by the artillery.

What is brought out most clearly from this is that when the enemy is expected to be met with, artillery *must march by big bounds from position to position, their observing parties going on ahead in each case. The observers should study the lie of the ground in front of them for a depth of four to five km., and make up their minds as to a suitable battle ground.* If this is done surprise becomes impossible.

3. The artillery regiment of the 3rd Colonial Division, *surprised in column of route, was at once paralyzed.* In spite of this it managed to protect the east and west flanks of the troops holding Rossignol. The batteries showed themselves well trained, both in bringing rapid fire to bear on the enemy when they came up onto hill 363 near Termes, and in the way they carried out the numerous changes of position in very cramped ground under heavy fire.

The German artillery proved its mettle, by pushing single guns right up to the edge of the forest to support the infantry. However their reconnaissance of the ground was bad, and frequently batteries were unable to engage the targets they were asked to fire on. Six-gun batteries proved cumbersome and often had to be split up into sections acting independently.

4. *Liaison* was bad. On the French side the groupes of corps artillery fought nearly all day without orders or information although the Colonel was in the midst of his units. This was due to lack of means of communication. There was little *liaison* between infantry and artillery.

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The German *11th Division Artillery* endeavoured, by firing high bursts, to show what they were doing to the *12th Division* without much success. Though better than with us, their *liaison* was also sketchy.

5. In conclusion is it necessary to point out the magnificence of the sacrifice made by the gunners of the 3rd Colonial Division? These men hung on under a hail of bullets and shell without ammunition, in the midst of their damaged guns and dead horses, putting up a fight until they had expended their last cartridge and were bayonetted at their guns by the German infantry. By so doing they enabled the infantry to carry on the fight until the evening and to inflict terrible losses on the enemy. A fine example of *brotherhood in arms* for all artillerymen to remember and be ready to repeat, should the occasion arise.

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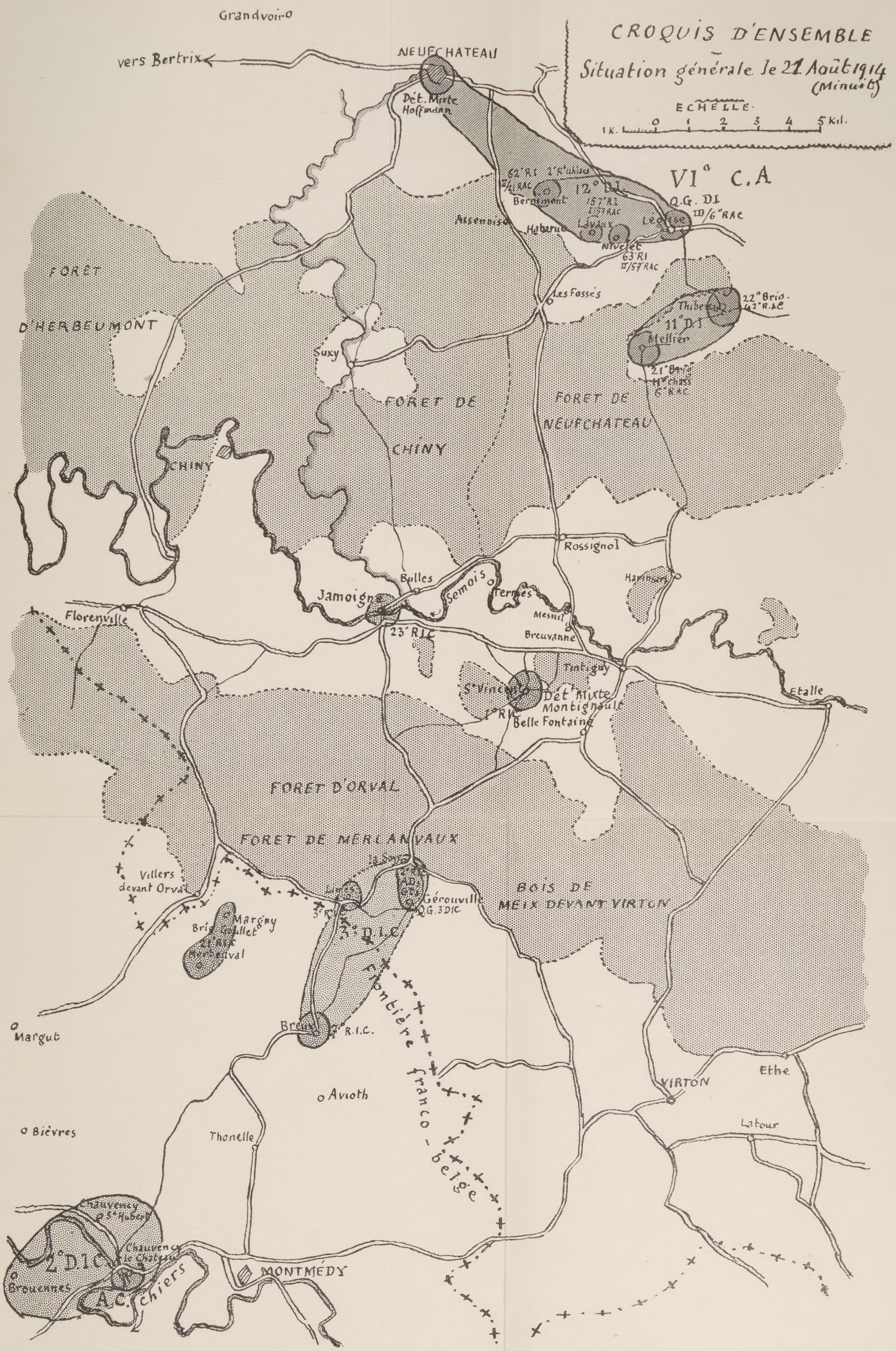
Assenois
Bernissart
Willemont
Mesher
FORET DE CHIN
FORET DE NEUFCHATEAU
Bois de Chênet
Rossignol
Termes
Les Bulles
Harmisart
Pres du Laurier
Jasart
Han
Poncelle
Bellefontaine
St Vincent
Bois de la Brez Chiarge
Bois de St Marc
Echelle 1 : 40.000



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THE 'HONOUR' TITLES OF BATTERIES IN THE ROYAL REGIMENT OF ARTILLERY.

By Major (Bt. Lieut.-Colonel) J. H. Leslie.

(Continued from Vol. lvi, p. 487.)

II.

'KIRKEE.'

31st Field Battery, Royal Artillery.

On 5 November, 1817, a small force of the Bombay Establishment of the Hon. East India Company's service, under the command of Lieut.-Colonel Charles Barton Burr, defeated the Peshwa's (Mahratta)[1] forces at Kirkee.

'Kirkee' was granted as a battle-honour to the regiments of which the Company's force was composed, by Bombay Government Order, dated at Bombay Castle, 20 May, 1823. The order runs thus:—

1. In order to perpetuate the remembrance of the acknowledged bravery and discipline of the Bombay Army, when engaged with the Enemy in the Field, the Honble the Governor in Council is pleased to direct that the following Regiments & Battalions shall bear on their Colours and Appointments the Badges of Honorary distinction hereafter specified, in addition to any Badges already bestowed on them.

Regiment of Artillery.

2. . . . . .

Captain [Edmund] Hardy's Company, a detail of which was engaged in the Battle of Kirkee on the 5th November, 1817, [to bear] the word

"KIRKEE"

on its appointments.

[1] Peshwa. The appellation of the chief Minister of the Mahratta Princes (from 1660) who made himself in 1749 the hereditary sovereign of the Mahratta state.

The princes descended from Sevají became *rois fainéants*, the administration being in the hands of the Peshwa; in 1749 the holder of the office, Balají Bishenath, seized the sovereignty and, without changing his official title, made it hereditary in his family. In 1818 his descendant Bajerow surrendered his power to the British, and the government of the Peshwa came to an end. *The Oxford English Dictionary*, under 'Peshwa'.

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Hardy's Company was, at the time, known as the 6th Company, Bombay Foot Artillery, and is to-day represented by the 31st Field Battery, Royal Artillery. The detachment of the Company which took part in the battle was under the command of Lieutenant John Laurie.[1] It is mentioned in Colonel Burr's despatch, dated 6 November, 1817 (see *London Gazette* of 18 April, 1818, p. 685) in the following terms:—

> "The Bombay Artillery, under the command of Lieutenant Laurie, rendered the most important services, and the spirited manner in which the guns were served greatly contributed to the rapid success of the day."

'Kirkee' was authorized to be borne on the colours of four Infantry regiments of the Bombay Army, viz.:—

The Bombay European Regiment, which afterwards became the 2nd Battalion of the Royal Dublin Fusiliers, and was disbanded on 31 July, 1922. (Army Order 78 of 1922).

The 2nd Battalion, 1st or Grenadier Regiment, Bombay N.I.—in 1930 the 2nd Battalion (King Edward's Own), 4th Bombay Grenadiers.

The 2nd Battalion, 6th Regiment, Bombay N.I. Disbanded in 1923, then being the 5th Battalion, 4th Bombay Grenadiers. (Indian Army Order 684 of 1923).

The 1st Battalion, 7th Regiment, Bombay N.I.—in 1930 the 10th Battalion, 4th Bombay Grenadiers.

The illustration here given is of an engraving (reduced) from a painting which now hangs in Room 195, at the India Office. The picture is described in the *Catalogue of the Paintings, Statues, &c.*, in the India Office (4th edition, 1914, p. 10), in these words:—

A representation of the first of the three decisive battles which marked the last Mahratta War. The British troops, under Colonel Burr, with whom was Mr. Elphinstone, the Resident at the Peshwa's Court, numbered about 2,800 in all, of whom 800 only were Europeans. The Peshwa's forces, commanded by Bapu Gokla, consisted of 18,000 horse and 8,000 foot, with an immense train of artillery. In the foreground is the ridge of Kirkee, with part of the British camp, and the two twelve-pounder guns which did such

[1] No. 228 in Colonel F. W. M. Spring's *List of Officers—The Bombay Artillery.* 1902.

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good service during the action. From this point of vantage we look over the level plain which stretches away to the hills whence Baji Rao watched the defeat of his army. From a murky sky, light strikes sharply on the middle of the plain, where is seen the thin red line of the British, forming three sides of a square, with an additional force on the left flank, and two guns posted at each end of the line. In front is the enemy's infantry, and all around, on each wing and almost in rear, are hordes of the famed Mahratta cavalry, charging fiercely on the ranks of the little army. As is well known, the British victory was decisive. Twelve days later Poona surrendered, and Baji Rao [Bajerow] fled, never again to bear sway. (Size, 41″ × 73″. Painter unknown.[1])

The "India Medal" granted in 1851, for services covering a period of 28 years—1799 to 1826—has a bar 'Kirkee', for the battle. Ribbon—sky blue—1¼ inch wide.

[1] In an engraving from this picture it is stated that it was painted "from a drawing by Major Sutherland in the possession of Francis Warden, Esq., Chief Secretary of the Government of Bombay."

(To be continued.)

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THE BOMBARDMENT OF THE HARTLEPOOLS. DECEMBER 16th, 1914.

By Major F. A. Yorke, M.C., R.A.

As Colonel L. Robson, C.M.G., D.S.O., Officer Commanding the Durham R.G.A.—the Fire-Commander at the time—has already published a very concise account of this action in the "Journal" (Vol. XLVIII, No. 10, January 1922), I do not propose that this article should be a mere repetition, but rather as a small addition to that which has already been recorded.

However, it will be necessary to give a short *resumé* of that memorable morning on which the only "hammer and tongs" action between forts and ships in home waters during the war was fought out.

The enemy ships engaged were the battle-cruisers "Moltke" (not as was then thought "Von der Tann"), "Seydlitz," and the first-class cruiser "Blucher." The remaining two, "Derflinger" and "Von der Tann" parted company with the above, steamed south and fired upon Whitby and Scarborough.

Our armament consisted of three 6″ Mark VII, two in Heugh Battery and one in the Lighthouse work. This latter was about 150 yards to the right flank of Heugh and slightly "refused" to it.

The remaining battery, two 4·7″ Q.F. at South Gare, on the south side of the Tees, some six miles away, did not open fire as a thick fog bank hid the hostile cruisers from this work. By the time that the ships—which had answered our signals in the first place—had hauled down the white ensign, hoisted their own and engaged, South Gare was out of range.

The combined squadron broadside opposed to us was:—

11·2″ guns	20
8·2″ ,, ...	8
5·9″ ,, ...	18
4·0″ ,, ...	18
Total ...	64 Guns

as against three 6 inch.

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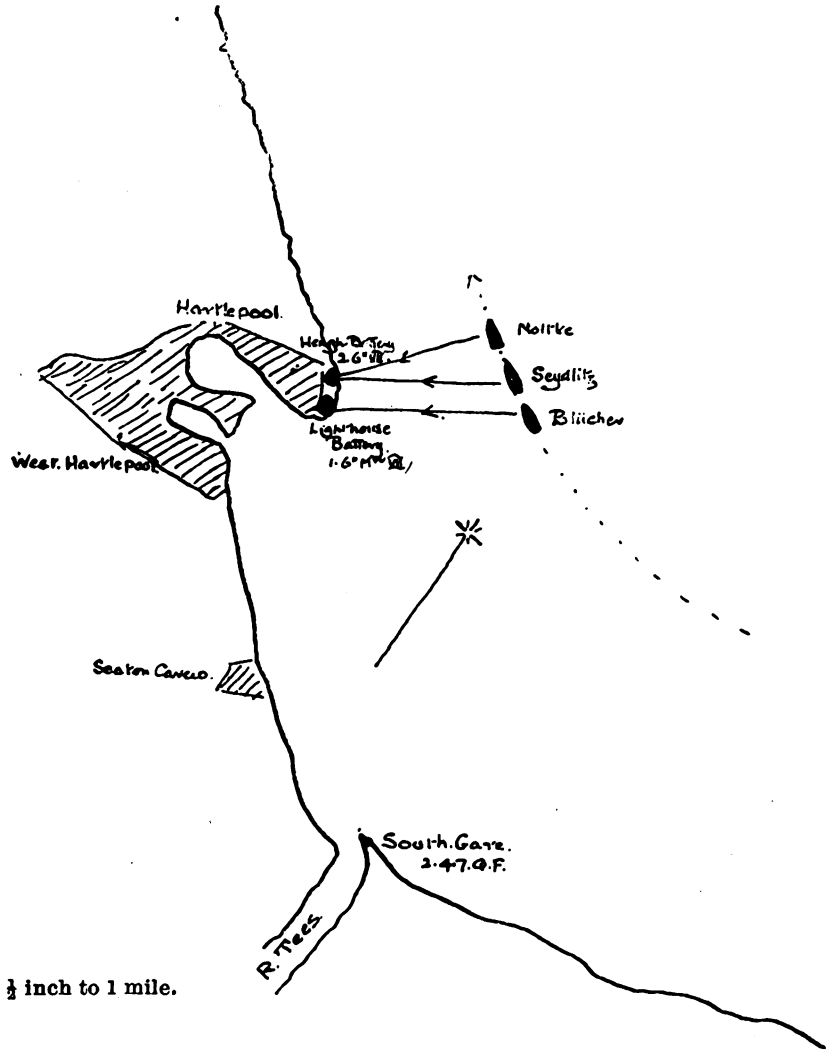
The action lasted 42 minutes, divided into phases as shown in the accompanying sketches. The hostile plan was to concentrate



Scale about ½ inch to 1 mile.

First Phase.

15 minutes concentration on Forts.

on the batteries for 15 minutes, then to leave the "Blucher" to engage the batteries while the other two dealt with West Hartlepool and the ship yards; the whole obviously being worked to a time-table.

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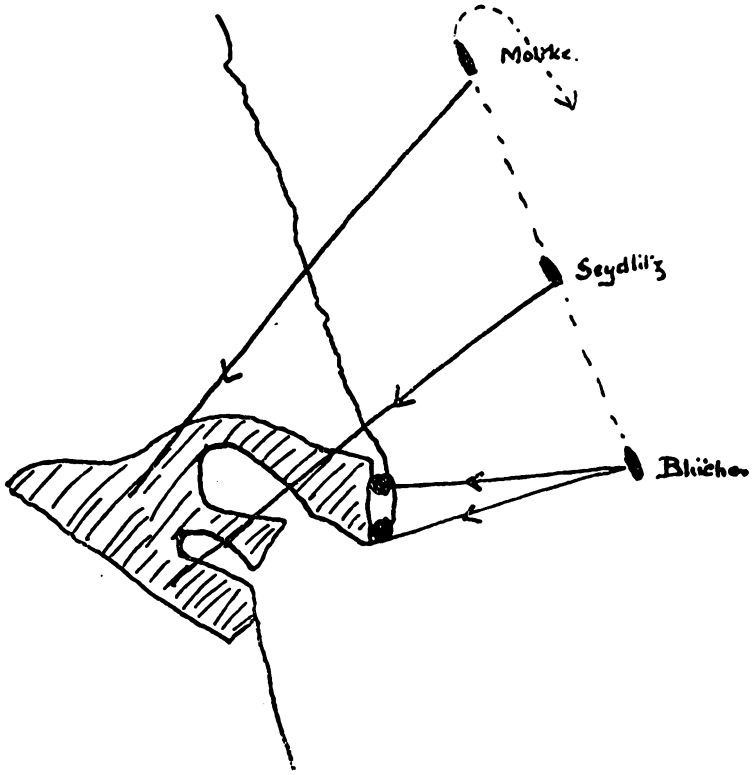

Second Phase.

"Moltke" & "Seydlitz" bombarding West Hartlepool, while "Blücher" engages the Batteries.

The concentration was fired at a range commencing at 6000 yards but "Blucher" took station at 4000 and got severely mauled in consequence. It was most unfortunate that this ship put herself in such a position that the Lighthouse itself protected her from the gun near its base. This latter incident combined with the smoke screen effect of the old powder-filled shell which she was firing reduced the rate of fire somewhat. However she was driven off by Heugh coming to the rescue, as soon as the other two cruisers had passed out of the latter battery's arc of fire.

The Lighthouse gun had particularly bad luck. After the lighthouse had masked it, there was no other target in its arc of fire which it could engage, as the other vessels had passed well to the north.

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THE BOMBARDMENT OF THE HARTLEPOOLS.

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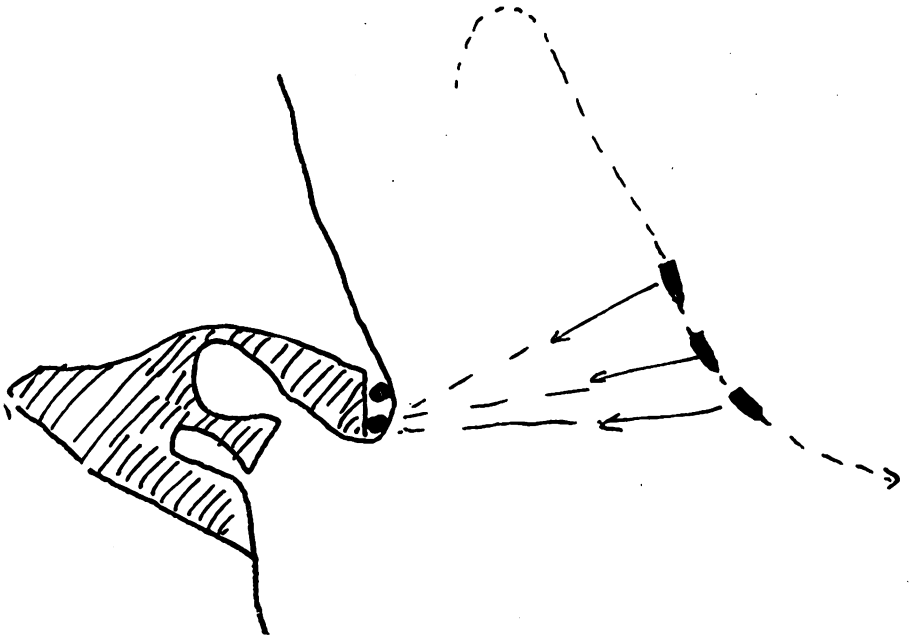
It is satisfactory to know that it was this gun which did so much damage to the Blucher before being temporarily silenced in such an unlucky way—it had carried away a good piece of the fore-bridge and dismounted two 5·9″ guns, sending up their deck supply of ammunition and killing ten seamen.



Third Phase.

"Putting to Sea" and firing parting broadsides at Batteries.

The action was continued until the enemy disappeared into the mist, the last round being fired at 9000 yards. The fight had lasted from 8.10 a.m. till 8.52 a.m.

Our casualties were :—

Durham R.G.A.	2 killed
R.E.	1 ,,
18th Batt. Durham Light Infantry ...	4 ,,

The picture depicts the above casualties, the gunners losing their lives in assisting the wounded.

In billets close to the battery :—

Durham R.G.A.	2 killed
18th Batt. Durham Light Infantry ...	1 ,,

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There were of course a good many wounded—about 20 all arms, as they were falling in on coming out of billets.

Enemy casualties: Throughout the squadron. 80 killed, 200 wounded.

The personnel was primarily the Durham R.G.A. (now the Durham Heavy Brigade) to which were added details from 47 Coy., R.G.A., and the District Establishment. For the action Colonel Robson was awarded the D.S.O.. and the three Gun-Captains, Sergt. Douthwaite, D.R.G.A., the D.C.M., Br. Mallin, R.G.A., and A/Br. Hope, D.R.G.A., the M.M. The number of known killed among the civil population was: men 58, women 32 and children 37. The actual guns are preserved in three territorial drill halls.

It is interesting to note that a camouflage extension to the top of one of the battery walls in rear of the guns—long advocated by Colonel Robson as far back as 1909—was erected in 1913. This gave the effect from the sea of making the armament appear on the top of a small cliff. Consequently as the concentration was carried out at a range of about 5500 yards the projectiles just skimmed over the guns and carried on into West Hartlepool.

This, in addition to the fact that the enemy were using armour-piercing shell fitted with delay action fuzes, to a great extent saved the battery and detachments, as the "shorts" displayed to the full all the proclivities of "bouncers" whose effect was felt by the unfortunate inhabitants who happened to be in the streets. Both guns were struck on the concrete apron in Heugh, B/2 alongside the muzzle; had direct action fuzes been employed both guns and detachments would have been wiped out.

123 rounds were fired in the forty-two minutes, a rate of one round per gun per minute. This was partly caused by the "Blucher" firing powder-filled shell on the rocks in front, it being low tide. Add to this some miss-fires and the temporary cessation of fire from the Lighthouse battery owing to the obstruction of the lighthouse itself, the normal rate could not be maintained. The method employed was that of quick bursts of fire in the intervals of this quasi smoke screen. There being no wind, this effort at what must have been the first deliberate smoke-screen of the war, was from the enemy point of view extremely successful.

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The rush of air from the 11·2″ as they passed low over the battery in salvoes fired at 5000 yards was so great that the Section Commander and gun-floor numbers together with any odd personnel that happened to be on the manning parade were knocked flat. I am told that the preliminary trickle of yellow fire down the ships' sides, the ensuing wait while the time of flight was running out, followed by the rush of air and "onde de choque" of a dozen 11·2″ fired at point-blank range and passing a few feet above was not a phenomenon which was likely to be forgotten even in France. Most of the present district gunners of this fire-command are old "bombardment" men. The great joke being that it was "a bit thick" to have to take on the German Navy and then proceed overseas and get it all over again from the Army.

An interesting piece of information came through as late as last year through a casual conversation of an acquaintance of Colonel Robson's when on the Continent: that the Captain of the "Seydlitz" was killed that morning when engaging the forts at Hartlepool.

I enclose a letter to General "Benjy" Burton from the Captain of the "Antrim," with Colonel Robson's permission. This was forwarded from the former to the latter officer. The General was then commanding the Northumbrian Division.

There is little else to add, except that the Master-Gunner, not to be outdone gave himself, that morning, a rest from his keys and ledgers by joining in whole-heartedly with the detachments.

H.M.S. ANTRIM,
Third Cruiser Squadron.

February 4th, 1915.

Dear General Burton,

I think it may interest you to know that your forts at Hartlepool did considerable execution on board the *Blucher*.

From the prisoners rescued when she was sunk, we hear that she was hit about six times and had ten men killed.

It was a pity we did not sink the *Derflinger* and the *Moltke* on January 26th.

It was merely a chase the whole time: 15,000 yards was the nearest our ships got, and practically only *Lion* and *Tiger* ever got within range. *Princess Royal* fired a few rounds and *New Zealand*

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and *Indomitable* merely finished off the *Blucher* after she'd been badly winged. However, both *Moltke* and *Derflinger* are very badly damaged and won't do any more raiding for some months.

The *Blucher* prisoners didn't say if the *Von der Tann* had been much punished by the Hartlepool gunners.[1] She was *hors de combat* from the effects of the Cuxhaven raid. All the ships got under weigh in a panic and some of them ran into the *Von der Tann*. She had to be docked.

Wishing you and your very fine command every success,

Yours, etc.,
(signed) W. MOLTENO.

[1] The *Von der Tann* never was at Hartlepool, though thought to be so at the time.

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A SUBALTERN OF ARTILLERY IN THE EIGHTIES.

By Lieut.-General Sir George MacMunn, K.C.B., K.C.S.I., D.S.O.,
Col. Comdt. R.A.

IT has always fascinated me to read of the Service in days before one's own, and try and realize what it was like a generation ago. It was always a disappointment that my father who had been in the Crimea and at the Second Relief of Lucknow had not the gift of telling one a word about it. He could not, to use Napoleon's demand, "Faites moi voir." There are many such. My father's pensioner batman at the Royal Hospital, Chelsea, had been at Inkerman and he had driven in the old "F" Troop at Lucknow. We used to say "Tell us about Inkerman, Irving!" and he would say "Inkerman, Master Garge, oh yes, we 'ad a bit of a brush that day, yes, a bit of a brush," and if you asked about Lucknow, it was the same: "Oh yes, we 'ad a bit of a brush at Lucknow too." Then I remember very well an old friend, a General Raikes, who incidentally came to stay with me at the Staff College in '03, aged 92 and carrying his own portmanteau, who wore many ancient medal ribbons, and the Mutiny was the latest. He had gone to India when George IV was King. But he would tell you nothing—no, stay, there was one story—it was after the Battle of Maharajpore in the Gwalior Campaign of 1843. He was then in the Gwalior Contingent Irregular Cavalry, and in those days the kit of the Irregular Cavalry of the Indian Army was even more eastern and gorgeous than, let us say, was that of the Silladar Cavalry before the World War. The Governor-General was with the Army and our friend had attended at the great man's durbar tent to have an audience. And he stood waiting in the *shamianah,* till the Governor-General was ready for him, in all his fantastic bravery. Two young guardsmen of the day, A.D.C's, were at the other end of the tent, and looked at him with interest. At last—those were the days when Jacks-in-the-Green and performing bears were every-day sights of the English countryside—one of them crossed the tent and asked "when he was going to begin"! It was almost the only incident of his life that he had remembered, so deep the insult carved its lines in his mind.

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All of which is but the introduction to my own humble yarn and the idea that while I can but sing of trivial things those who can sing better won't, while I believe that those who remain with us will be glad to hear of old names and faces they knew "when all was young," and those who are young may like to know what it was like in the eighties. So here it is.

I had the privilege to be posted to L Battery, 2nd Brigade, a field artillery brigade[1] of which there were then four—incidentally an organization more logical than our subsequent change to one long roster of batteries, and a later hap-hazard stabilizing in the present groups of regimental commands. L/2, as the nomenclature then went, was stationed at Woolwich, and had a reputation in that for many years its officers had passed on to the horse artillery, the Mecca of those days certainly to all at Woolwich, and before the era when soldiering round the world and the mountain artillery had become desirable. Those who were irreverent in the Woolwich Mess used to speak of a solemn ritual known as "sitting for your jacket" which apparently consisted in sitting in your best stable jacket in the Mess drinking Madeira at 11 a.m.

Horatio Smyth, known as "Smith with a 'y'," was our major, clever Fairholme was the captain, but had just got into the Staff College, and the two subalterns, very junior but with great and very deserved reputations for smartness and efficiency, Arthur Townley Butler and William Mowbray Thompson by name, and both well calculated to make a young officer smell hell when need be. To me who have hobnobbed with commanders-in-chief and have even been one, and who have served Lord K. and Haig and Maude and Monro, the biggest man of all to me still is "Black Tommy" my senior subaltern of those early days. The two went off to their jackets ere long and retired as Brigadier-Generals full of honour after the World War. Thompson was a slight dark man and was known as "Black Tommy" to distinguish him from White-Thomson in the Regiment. Names of reverence on their lips were those of Beadnell and Newbiggin who had both served in the battery.

That joining at Woolwich was a time of great glamour, when one did all one's drill and even took out the exercise in one's

[1] A body of 15 batteries or so.

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stable jacket, the smartest dress ever worn in any army, with one's white pouch belt and slings and undress sabretasche. Its variation was the frogged patrol with false jacket below the patrol, worn open. The false jacket was made with thin silk sleeves and no shoulder cords and on duty the pouch belt was worn underneath with looped ends and no pouch, a very picturesque kit for winter. Those were the happy days when a second lieutenant's pay might be calculated, as the good Mr. Cox was polite enough to inform you, at eight golden sovereigns a month.

"Oh five bob and seven a day, what a lot for a subaltern's pay,
Yet happy is he in the Artilleree, on his five bob and seven a day."

It was threepence more than the infantry, and duly recorded in song "five bob and four with a threepenny more."

When I see the messes of to-day with their all-in three-course breakfast, I wonder, for in those days young officers and on small allowances breakfasted in their rooms on an egg or herring cooked by their servants, which cost them perhaps fourpence. Then one reserved oneself for Mess dinner as the principal feature. It was worth while to deny oneself for the privilege of wearing Her Majesty's sword, and saving your money to hunt or shoot.

Within two months of joining we found ourselves *en route* for Bombay in the *Malabar*, to be stationed at that delightful place Kirkee. It will surprise officers to-day to hear that so recently as 1888 we embarked in what was the marching order of the day, viz. full dress tunic and red-stripe overalls with helmet and white sword and pouch belts with undress 'tache. Indeed if you marched in relief through England you wore the same. There was a white drill haversack to complete the rig. On board we wore the "sea-kit serge" which was also the jacket worn in drill order in India with sword belts of webbing, white slings and pouch belt. The collar was plain rise and fall serge and the only ornament was a gold lace grenade on the collar and an Austrian knot of black braid on the sleeve. We wore a sweating collar of white linen buttoned onto the collar. Military millinery has always an interest of its own, and I make no apologies for giving these details, and I have a lively memory of a breakfast in that marching order in the Woolwich Mess at 7 a.m. before entraining for Portsmouth.

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As we sailed out of Portsmouth harbour the band on the *Victory* played us out to "Life on the Ocean Wave," and to this day that air brings the stirring scene to memory most vividly.

The old troopships were beastly uncomfortable compared with the transports hired from the great shipping companies of to-day. Naval discipline and routine were calculated to make the landlubber most profoundly uncomfortable and the men were treated like dirt. In L/2 we had the most horrible affliction, a battery band, against which institution I warn all and sundry. Knowing nothing of bands and music I was put in charge, there being a renegade bombardier with us from the R.A. band. I and it led a harassed existence till Ted Hobday came to be our captain, when it took heart of grace and we rose above Boosey's annual and such like. The real trouble was that if you told off any member of the band for any form of slackness the move was always the same. "Beg pardon Sir, Gunner Jenkins Sir, 'e wishes to resign the trombone." Gunner Jenkins usually turned that trick.

In those days we tied up at night in the Canal, which was then a very lawless part of the world, and Port Said a pandemonium before the Anglo-Egyptian Police got their grip on it. Two larky lads, Harvest and Armitage, having drunk repeated healths unto Her Majesty, elected to swarm down the cable in their mess kit and go ashore, forgetting in their zeal that the shore end dipped into the salt sea of the canal before reaching the bollard. They however persevered and disappeared into the night. An hour or so later we told the First Lieutenant who gave us a boat and, manned by half a dozen subalterns, we rowed off to look for our lost brethren. After a pull of a couple of miles we landed at El Qantara and there, in a villanous shebeen, found the missing artillerymen in rather wet mess kit seated at a gambling table, surrounded by Arabs, and dragged them home, bidding them rejoice that their throats were whole.

I fancy most of us, especially those who go to the Shiny young, have lingering memories of Bombay and the first night in the East. I had leave to spend a night ashore, and the first early morn in Watson's Hotel with the crows amid the trees in the garden, the first *chota hazri*, and red plantains, all leave a glamourous memory, and by the same token never do I drink a lime squash without the

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recall of drinking the same in the rest house of the old trooping shed after a couple of hours or so of baggage fatigue in the sun.

That evening we moved up the ghats in a whirl of expectation and rolled into Kirkee at dawn, the major dancing with excitement, biting all and sundry as was his wont, till we marched up to our lines to find no less a tiger than Captain John Harvey of happy memory handing us over the horses and equipment of E/2 (I think) who had gone to Ahmedabad. John could not abide young officers and his teeth met in my calf without delay.

Kirkee was then exactly as it is now; in 1923 as Quartermaster-General of the Army I inspected the station and not a tile on a bungalow seemed replaced. During the War I had come over from Mesopotamia and stayed at Government House. Turning into the Mess to call where I had not been for a quarter of a century, a voice said "*Salaam MacMunn Sahib!*" It was my old dressing boy, the same whom Roger Massie and I used to lock up in a portmanteau when he was tiresome, and the East never forgets an old master.

In those days the artillery were unbrigaded and the commands were station commands. It was a horse artillery command with one battery R.H.A., "I" of "B", otherwise "I" Battery, "B" Brigade, commanded by the good Broadfoot, known to the Indians as "*Brasspot Sahib,*" who never left the mess table before midnight and would run his fingers through his long hair. He was a nephew of the famous Broadfoot of Jallalabad who was killed at Moodkee or Ferozeshah, and a dear. Thomas Le Marchant was the Lieut.-Colonel with a pretty useful reputation as a smart artilleryman of the old school, but lived in a different world from the young folk. He and Broadfoot solemnly drove to the club in Poona in a brougham every afternoon, for men were much older then than now in their ways.

Tom Holland was the Captain of I/B and a very kindly man to us lads, while Cloete, Hector Corbyn and poor MacGildowny, killed by a fall from his horse a few weeks later, made up the subalterns. Eager Corbyn was very kind to me and I cherish his memory greatly and have always mourned his sad death when commanding a horse battery at Sialkot. The other field batteries were C/3 which had come out with us, commanded by R. G.

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Hepburn with de Jersey as Captain, Dickinson Hall and father Glanville as subalterns, and G/3, commanded then by Willie Forster, their Captain, with Bobby Ellice, Arthur Kennard and my special chum Roger Massie as the subalterns. Dear Tubby Lister who told yarns all day long and never repeated himself and who marched with a mountain battery in the famous march to Kandahar, came to them shortly as major.

Among the gunners of some renown was the Colonel on the Staff Holberton, one of the last of John Company who had served with the Bombay Artillery in the Mutiny. The outstanding yarn about him was that once the Head of the Indian College of Science had asked him by what authority the batteries at Kirkee drilled on the *maidan* near the college and he had replied laconically "Authority Battle of Kirkee, November 5th 1817" which was certainly as good an answer as any other. The battlefield actually lay across our drill ground and part of the cantonment, the memory of an amazing resistance to vast hordes of Mahrathas when Baji Rao broke his treaties and attacked his subsidiary force . . . . the Baji Rao, last of the Peishwas, the sound of whose myriad horse folk say you can still hear o' summer nights, on the plains of the Deccan. A very fine gunner, one Rawlins also a Company's gunner, succeeded him, an old Madras Artilleryman, and C. A. Anderson (now Lieut.-General Sir Charles Anderson) was his staff captain.

At that time the Presidential Armies had their own commander-in-chief, and each Government its own military department, as well as its own ordnance and commisariat services, and maintained its own Native Army. The authority of the Commander-in-Chief in India over the Native Armies of Madras and Bombay was limited and only the British troops were administered from Simla. This system, the relic of the days when each Presidency was separated by many hundred miles of jungle and independent country, had much to recommend it, and it may be argued that a better policy would have been to bring it up to date and remove all differences of establishments and system rather than abolish it. The Duke of Connaught was then Commander-in-Chief of the Bombay Army and an efficient and kindly one too, as we lads all went at one time or another to his hospitalities. The mess was

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especially pleased because at a recent tandem meet Hector Corbyn had been dressed, by Mrs. Willie Foster gossip said, as a very smart young woman driving a smart and well disguised tandem. The strange lady had attracted much attention, and the Duke had strolled over to have a word, and the Duchess had wanted to know "who on earth that woman was," or words to that effect.

SPORT IN AND ROUND POONA.

Among the sporting celebrities were Jack Hanwell, the general's A.D.C., a famous owner and rider and *beau sabreur* as ever was, killed, it may be remembered, in South Africa by a sniper's bullet while his battery was outspanned. Poona raced then as now, only not quite so professionally, and racing was in strong hands. Paddy Anderson, our staff captain, was one of the celebrities who kept an eye on evildoers. Arthur Gaye, then the brigade surgeon, had begun his life in the Artillery Medical Branch, and was forward in all riding, especially with the Poona hounds, then as now flourishing. The Tent Club, now revived, in those days was dead and there was practically no pigsticking.

Sport round Poona was hard to get and expensive for the young officer. The dearth of pigsticking was serious, for there is nothing to stimulate the field qualities that can compare with it, and there is no outing so jolly as the pigsticking camp, nor if well run, one less costly. One of the features of present-day life is the revival of pigsticking enthusiasm for the sport throughout India, and at the lesser stations it is largely run and has principally been revived by the officers of the Artillery, in places too where pig have not been hunted for years and it was the fashion to say that there were none. In Poona when I was there I only once heard of an informal hunt by some subalterns of the Bombay Cavalry up, I think, at Barsi Road, while now I gather the earlier Poona Tent Club flourishes. The Poona Hounds always flourished but cost more than many young officers could afford. I remember that "The Gat",[1] the gallant eager "Gat," to whom such disappointment came in South Africa and who was quite the hardest soldier of almost any time, was Adjutant General of the Bombay Army. He was a keen supporter of the hunt and was a pretty

[1] Major-General Sir William Gatacre.

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draftsman to boot, and one day the station was placarded with a large picture depicting a jack looking out of a hole. Below was written "What are you doing in that hole?" "Oh! I am only hiding here in case General Gatacre should come along and ask me for my subscription to the Poona Hunt."

The able Major Tidy of, I think, the Loyal N. Lancs. was then the D.A.A.G. for Instruction, a writer with a pen often dipped in bile and whisky, who took off many people and caused much merriment by lecturing on recent manœuvres where the brothers Gatacre commanded both sides, at the famous battle of Yerrowda designed to reproduce the passage of the Mula-Mutha by the British in 1817 in the face of the Peishwa's army. "And here at the river," as Tidy had it, "William D.S.O. was defeated by John C.B." However the Gat led in all eager sport.

The only big game, and that was hardly worthy of that name, were blackbuck, to be got down the line and an occasional panther, best got by tying up your terrier at Lanowli. A famous old soldier, Colonel Richard Westmacott, afterwards General Sir Richard, and known to the army as "Uncle Dick," commanded that very famous regiment, for some unaccountable reason recently reduced, the 28th Bombay Pioneers. Such tiger as the district held usually fell to him, for he had the best shikari and a vast system of "Khabar." He belonged to that now defunct set of sportsmen to whom life in India meant tiger shooting and for whom little else counted.

Small game were none too plentiful, and you had to go far afield. To get a bag of snipe and duck you had many miles to ride and many different strips of jheel to visit. Still if you really worked you got quite a good mixed day. The car which helps so in most cases to-day, will not help there. Knowledge and a battery horse or two and an Indian driver with a leg o'mutton case for your gun and not too much lunch was the better line. I expect I could get a better bag there now than most. Painted partridge in the Indriani and snipe at Suss and Marunji were some of the best lines if I remember right. There used to be a pretty good corner for snipe in some rice fields the far side of Karakwasla lake.

The polo of those days was still the happy station polo and the tournament cult was but beginning. The price of ponies was

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then called prohibitive but you could get a truck load of Arabs from Bombay at Rs350 each, while folk told you that at Deesa you could still get a pony for Rs90. At the smaller stations everyone still played, but the game as it's played to-day was steadily developing and before I left Poona, De Lisle was starting his career and development. All the horse artillery played well, especially Holland and Hector Corbyn, and the gunners generally more than held their own.

Paddy Anderson, Hector Corbyn and Jack Hanwell had all reputations for cross-country or flat race riding, and those were days when horse racing as the sport of the soldier was only beginning to go down before polo. Even small stations still had their racecourses, and sky meetings as well as the larger races were universal. Many officers still owned and raced and the army knew much more about training than now. In fact the getting a horse fit to race was a cult well understood and every regiment almost had an officer who knew or thought he knew the last word on the subject. But even in the eighties the glory of racing was gone as the universal sport of officers who could be honest over it, as apart from the well-known clique of rogues. For the fifty years preceding it, the army had raced hard and very good fun apparently it had from it.

Some personalities.

The fun of reminiscences lies in personalities and there are some men of those days to whom the chapter of Ecclesiastes' "Let us now praise famous men" would apply, famous for their character and their sometimes eccentric ways. In Poona, in addition to the brigade of horse and field artillery at Kirkee, there was a brigade of native mountain artillery at Wanourie, the upper cantonment of Poona, with the officer's mess in an old bungalow, now pulled down, close to the kennels, which had been the old headquarter mess before the Mutiny of the Bombay Horse Artillery. This brigade consisted of No. 1 and 2 Bombay Mountain Batteries, the oldest Native Artillery in India, older than the Frontier Force Batteries, which in pre-Mutiny days had been No. 1 and 2 Companies Golandaz[1] or Native Artillery, and which used to "go into

[1] No. 2 Company had served at the Siege of Mooltan before the frontier force was thought of.

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battery," to use the old phrase of the regiment, with the Khandeish and Scinde Mountain Trains, or in other words take over those equipments exactly as till quite recently certain Garrison Companies took over heavy battery equipment. This brigade was commanded by that most able of Artillerymen, Lt.-Colonel Hime. He had never served with the mountaineers till he came to command this brigade and the prospect pleased him immensely. He always addressed his brigade as "my Switzers" and appeared on parade in khaki and white sling belts. Kit of that kind was then a little hazy. However the General did not approve of this order of dress and remonstrated, and the colonel had the honour to state that he was about to provide himself with the "John Brown" belt. He took up his residence at the Poona club to the delight of the younger members as there was no dining mess at Wanourie. The General suggested that he should live in the mess at Kirkee, but said that he preferred to live near his mountaineers "free as the Swiss." I have known him dine with us at Kirkee and deliver at midnight his famous lecture on von Moltke's strategy of which he had a poor opinion. His mind and brain capacity were far above what is ordinarily to be found among soldiers. Those who remember him as Secretary of the Royal Artillery Institution will also remember that the story of the domestic article in use in His Majesty's service for lunatics, is really attributable to him, in contact with, I think, Sir John Adye senior.

The mess at Kirkee in '88 was still fresh with the memory of the farewell dinner to the "Treasure",[1] the poor Treasure killed as a "dugout" with Yeomanry at Senekal in a typical "Treasure" episode, a glorious enough ending to the original of the Kipling ballad "The Captain waved a corkscrew in 'is 'and."

I gather the later festivities commenced by jumping the tum-tum ponies over that magnificent mess table which still remains, and then they adjourned in glory to the railway station, led by Jack Hanwell and Willy Foster. Having taken possession of the ticket office and issued first-class tickets to all the waiting Indians, and having pasted the Indian station master all over with luggage labels they proceeded to board a stray engine that stood with steam

[1] H. S. Dalbiac.

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up in a siding (I but tell the story as told to me), and after a native fireman had floored one or two, Jack Hanwell and another got aboard and turned on every tap they could find. The iron horse then galloped up the line and had a good run many miles before the stopping tap could be found. The railway authorities were not pleased and only matrimony between an offender and the daughter of a high railway official healed the sore, and if that is not true it is at any rate one of Benjamin Trovato's good ones.

Anent that mess and mess table, which stands to-day as it has stood this eighty years and more, I believe that the table is the missing table of the 24th Foot, on which the bodies of, I think, 13 officers were laid out after Chilianwallah. Mess tables and bullock carts that carried them, went into the field in those spacious days. The present artillery mess was in 1857 the messhouse of the British Cavalry regiment stationed at Poona, the artillery headquarters of the Bombay Artillery being at Ahmednagar, and at that time the 14th Light Dragoons had it. The name of that corps was, and perhaps still is, recorded on the harness room door nearest the station hospital. I believe that the 14th Light Dragoons took over the table from the 24th when the latter came home from the Punjab, and it was left *in situ* at Kirkee when the 14th marched out to join Sir Hugh Rose's force in Central India. The British cavalry station was transferred to Mhow, the gunners to Kirkee, and that was how the table came to remain where it was. I forget from what old source I heard the story, but the yarns of the grizzled drafts of years gone by have always attracted me.

Here is also a story current in those days· Those of us who have served in the old cantonments such as Saugor, know well and may often have had a bungalow with a *bibigarh* attached, the house for the native lady sometimes even married in due form, who once consorted with the occupier. There was one senior officer in those days at Kirkee with an Indian consort, but the story ran that in his subaltern days, his consort at Belgaum had been a lady of family, and an Afghan family at that. She was wont to take her airing on the mall with armed escort as Afghan ladies should, the which not being a recognized appenage to a subaltern's household, caused a scandal. Military authority wrote orders that the arrangement should be terminated forthwith. The officer in question,

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however, submitted an application that matters should be allowed to remain as they were "till the end of the financial year." The story goes no farther.

My Major, Smith with a 'y', left us, to my relief, as I found his attention embarrassing. I was, or he thought I was, hard of hearing, and his voice on parade might be heard at critical moments directing the trumpeter "to go and see if Mr. MacFinn" (he never got my name right) "is listening to me." The trumpeter on his horse always shot with glee like an arrow from a bow. "The Major's compliments Sir, are you listening?" There one or two senior officers in the regiment to whom to this day I am known as "MacFinn." But one day it was my turn, on a large ceremonial parade. He had brought out two young Irish chargers which he could not ride. I was in front of the centre section, and I heard him say "Is Mr. MacFinn there?" "Yes, Sir!"

"Oh! Mr. MacFinn. I am riding one of my young horses, if I have to throw away my sword would you let one of your limber gunners pick it up quietly for me?"

Alas he had to, just as the Duke and staff came by, so he took a half-pay lieutenant-colonelcy. But now I know that he was the kindest-hearted thing out, for all his bristling waxed moustachio points, and had been seen at his best at Souakim in '85 with a corps of African coolies carrying red and white striped umbrellas. Bless his heart.

But then there came to command L/2, now called the 55th R.F.A., one of those men whom each of us can put away and worship for all time, J. R. H. Potts, the quietest, most knowledgeable and soundest officer it has ever been my privilege to serve and be told off and taught by. A great cross-country rider, a fine horsemaster, a first-class gunner, he was the type of man you only find in our regiment. He remains for me in that little shrine of heroes, in which are also Douglas Haig and one or two others, the men whom it is worth while to have known and served.

He was known to the brigade as Potts the Painter because he had heard, as the hot weather was beginning, that a certain German prince making for Bombay, had been promised a ceremonial review by the Duke. Potts immediately began his annual paint of car-

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riages, and was known to the world as "the Painter" thenceforward. He lived at a bungalow Bally Potsdam and his horse was Potheen, and he came from Athlone. God rest his soul, for a finer gunner never stepped.

I wonder how many there be who remember with affection Sergeant-Major Wark, a hard-bitten warrant officer. I always think of him when I read in my scrap book those lines that appeared not long ago in one of the last editions of the much-lamented *Saturday Westminster*, under the signature Leopold Spero. They seem to me to stand for all that the really good N.C.O. in our army means:—

"And there came a flash like a whole sky rent
And the kick of a horse where my elbow went
(My right one) so that I tumbled flat,
In the ditch where the shrapnel buzzed and spat,
And I bit the shoulder in panic wild
Of a sergeant-major, who only smiled
And said 'they're bracketing sure enough,
They always do with that H.E. stuff.
But you're all right Sir, sit down there,'
And he laid the arm of my tunic bare."

Then there came to us one Bannatine-Allason, whom the whole regiment knows, as adjutant, with a pretty way with slack officers, and of him I learnt much that lads should know, and when such as he smile on one the world is worth living in. But there were plenty of names to conjure with in those days besides in the regiment. Another Bombay gunner was General Brabazon Pottinger, who was practically the war minister of the Bombay Government, and we married our captain, Ted Hobday, to his daughter in great ceremony. Many there must be still who remember the open house that Polo Vista was. Pottinger was the nephew of the famous Eldred of Herat and Kabul fame, and his son Eldred was in the regiment a-mountaineering with me. The 3rd Light Cavalry were our special friends, particularly Wogan Browne, and Geoghehan who had been so distinguished in the retreat from Maiwand.

I joined with Ted Hobday in several of his troops as scene-painter and handyman, and indeed the whole battery was swept into the service of his burlesques, often a chorus of a dozen men

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of the battery much enjoyed a trip with the company to Bombay, where we would perform.

I find I have said little of the men of forty years ago, but then the men are always what you make them. I imagine that the British soldiers and men-at-arms have ever been the same loyal staunch creatures since the Crusades on, reflecting however the ways of the strata from which they are drawn, as those ways change. For instance, now that the countryside is sober the men are sober. Even in the eighties the desire for drink was much less than it had been, and even the time-expired drafts were reasonably easy to handle. Our men all came from the Eastern Counties in the days when we were affiliated to different depots, and a very good lot they were. Among them was a whisky trap of an Irish gunner who had won the VC. at Maiwand, and to him some licence was allowed. Gallant he was but a detestable character withal. Our quartermaster-sergeants and farriers were gems as they always are, and I like to think that men exactly like them must have been with Richard Cœur de Lion in Palestine and with the Black Prince in France.

In the eighties in India our dress was blue, and white drill, we wore the khaki jacket in field service marching order only, viz. at manœuvres and practice, but never in drill order. Regimental blue pants and jack boots were the order for the lower man or blue putties, and a very good kit too. In Poona the mountaineers, whom I joined later on the frontier, wore a different serge of Norfolk jacket pattern, with regimental pants and the old field boot of "liontamer" pattern, loose and wrinkly and comfortable, while the native gunners in a loose serge with red collar, very loose red stripe knickerbockers and a huge red pugaree were the last word in picturesqueness, especially if you marched with them thus as I did in the deep gorges of British Baluchistan. The helmet served out by Government to the troops in India was the very *acme* in atrocity, fit, as the arrogant field artillery said, for a garrison gunner, which with the water buffalo were the ugliest things in India, and they certainly were if they wore that atrocity. However, if batteries liked they could buy their own and draw compensation, so the fashion was for batteries that fancied themselves to buy a helmet of very smart cut known as the "Tenth Hussar" pattern.

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The Native Army wore cloth in the winter and rains and khaki in summer. The scarlet zouave jacket, loose knickers and white spats as worn by the infantry were most picturesque. The now defunct Hyderabad contingent, which was a force directly under the Government of India and not under the Commander-in-Chief, attracted most of the young officers of the British service in those parts whose thoughts turned towards what was then called the Indian Staff Corps. They were dressed with more gorgeousness, especially the cavalry. There were four field batteries, officered by the Regiment. Service therein was not looked on with favour by the alert, for the batteries had two smoothbore guns, 9 prs. I think, and two 12 pr. howitzers. They mobilized as ammunition columns. The Rs150 a month extra pay attracted the married officer and sport was wonderful. They were the only field batteries then manned by Indians since the Mutiny. Since the abolition of the Contingent as a separate force and its absorption into the line the guns have gone. They were well horsed and the Hindustanis, who had made such good gunners in the Company's Army, were good as gunners and drivers. But they are gone and *sic transit gloria mundi.*

One little fact more may be illuminating to those who remember. Our native establishment such as *mutsuddies* used to be issued with a funny little shell jacket of rough grey cloth with red collar and cuffs in which they used to parade on muster day, an absurd and most unsuitable garment common, I think, to similar entertained followers in British and Indian units. When I was Q.M.G. I discovered by chance that when the Mutiny was over and all the regular light cavalry had mutinied (and most of the irregulars), there was in store a large number of French grey shell jackets worn by the former after the British pattern. As the old dress copied from pre-Crimean British uniform was now taboo, it was ordered that these jackets should be issued to followers till used up. But in the East *dustur* is a powerful god. The Clothing Department went on reproducing these absurd garments for issue to followers without reference or thought for fifty years more.

I find in all this yarn I have spoken of nothing behind the splinter bar which is very wrong and archaic. L/2 had then the 9 pr. R.M.L. of 8 cwt., and I think the other batteries being in the

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field army had 12 pr. B.L. Sir Charles Nairne was just beginning his campaign of modern training, and Yeatman Biggs's schemes and plans were being tried out. Competitive practice had just come in, and it ended with a gallop in to 100 yards and a series of case shot. The suck-in was that it was damned hard to get a score on even the wide screens waiting for you to hit so invitingly.

With that I bring to a close what is meant to be but a prosing. I have left out the best stories because they won't always print!

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ASTOR, LENOX, AND
TILDEN FOUNDATIONS

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THE IBEX.

(*Capra Sibirica.*)

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IBEX.

By Brig.-General Cosmo Stewart, C.B., C.M.G., D.S.O.

I.

"DOODOO the shikhari waits without, Sahib." Such was the welcome announcement of my trusty body-servant, "Ugly," one morning early in May many years ago. This news had been awaited with impatience for weeks in winter quarters in the old Dogra fort at Nomal, twenty miles beyond Gilgit, and surprised me having a very disagreeably cold tub in my one room, fourteen feet square, high up in a tower, innocent of proper doors and windows, and exposed on all sides to the winds of heaven. Indispensable ablutions were hastily completed, and I shouted for my visitor to be admitted. I was due to return to India in September, and for one reason or another had had no opportunity of getting out after ibex at this, the ideal time of the year, and had so far secured no good heads.

Ibex are if anything more elusive than markhor. The latter exist more or less along the snow line, and are driven down by it. But ibex disappear in winter, and only once have I seen a solitary small ibex in January when out after markhor, and then well up in the snow. In spring, however, when the young grass first shoots from under the receding winter blanket, the ibex descend to graze greedily on the higher *mergs*, until scared away to still more remote pastures by the village flocks in their annual migrations.

Naltar Nullah, running down to join the Hunza valley at Nomal, was famous for ibex; and this was likely to be my last chance after them, as the mountain battery would shortly move to summer quarters near Astor, where the game had not yet recovered from being too much shot out before the Gilgit road had been closed to sportsmen.

"Salaam Doodoo, what news have you?" I asked. Doodoo was distinctly one of nature's gentlemen. Not more than five feet five inches, he was well made, extremely good looking with fine, well-bred features and a silken beard, always scrupulously clean and tidy, and possessed of beautiful manners. Incidentally he was

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the *Lumbadar,* or head man of Naltar village. He and I were the best of friends, and for long an agreement had existed that as soon as the ibex showed up his valley, he was to come and let me know. He had a charming smile and spoke Hindustani with some difficulty in a low musical voice, and was about the last person one would have imagined to be a very cunning shikhari.

"The news is good, Sahib. The snow is now beginning to disappear off the lower slopes of the *mergs,* and the *kail* (ibex) have been seen. The time for shooting has now arrived. I have left a man to watch."

Naltar Nullah stretched away back to the west from Nomal for full forty miles, shut in by ever higher mountains, and terminating in one vast glacier. The village lay ten miles up it, approached only by an execrable track. It was overhung nearly everywhere by great *parris* or cliffs, which for the first few miles formed a narrow gorge. The cliffs were anything up to three thousand feet high, and above them again the ground rose in long, steep, grassy slopes for another two or three thousand feet to meet the rocky outcrops at the bases of the mighty peaks, which towered up clothed in perpetual snow and ice.

These grass slopes formed ideal ground for ibex as the snow receded up them. My preparations had been made; a comfortable camp stood ready outside the village, and I had secured the option of ten days' leave whenever I wished to avail myself of it.

"Oh excellent Doodoo, may you never grow tired! I will arrive at the village about sundown. Do you return and have all things ready, so that we may ascend to the *mergs* before daylight to-morrow. Rations will go up for all with my servant and orderly. The coolie who makes grass shoes can go with you; he has a supply for all. Take also my rifle and the telescope. We will see how far the occasion is favourable, and may our *Kismet* be good. If it is I will stay ten days in the nullah. Come to my tent at sundown, and we will arrange for to-morrow."

"Ugly" departed with some mules during the morning, and I followed on foot in the afternoon. How I loved that nullah! It was a veritable sportsman's paradise. As I ascended it, the eye was delighted by every kind of mountain scenery. The apology for a path meandered in and out of the rocky snow-fed torrent bed,

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and, rising rapidly, I first traversed a tremendous defile, among the cliffs of which I had spent many happy hours after markhor. Resting at intervals, I scanned the heights above and around with binoculars, deluding myself at times into thinking I had spotted something which must be an animal, and priding myself that at long last I had learnt with unerring accuracy to know exactly where a markhor would lie up, only to be disillusioned by more careful inspection.

After a few miles of such rock faces, the valley opened out a little, and pines began to appear high up, standing out in strong relief against the dazzling snow. Every now and again the rumbles of distant avalanches could be heard, and some of the side nullahs were blocked deep in snow. Then came the last straight climb up a thousand feet of great boulders and debris, the terminal morraine of what had once been a great glacier, where the track was not easy to follow even by daylight.

From the top the little hamlet of Naltar came into view, nestling like a pearl in its bower of apricot trees in full blossom under the great cliffs. The valley itself could be seen for miles on ahead, the snow line lying close along the foot of the northern slopes (i.e. on the south side of the valley), but two to three thousand feet higher up on the opposite side, relieved in places by woods of pine and deodar. Above the cliffs over Naltar I could see the bare grass *mergs* beginning to emerge. They were to form the first hunting ground.

The air was cold, and the comfort of a tent very welcome, with a little Canadian stove burning merrily. "Ugly" was ready with a cup of tea, and as it was to be the last night in warmth and shelter, it behoved one to make the most of it.

Doodoo appeared shortly after, accompanied by the second shikhari, and at my bidding they ensconced themselves cross-legged on the carpet near the stove. I noticed the former had a few extra bright coloured little paper charms hanging from the folds of his pugri, to bring luck and keep off the evil eye. A small present of much-prized tobacco was courteously accepted.

"There is good news, Sahib. The *chhota* shikhari states there is a herd of ibex on the mergs above the village with several heads fit for the Sahib to shoot, but he has seen no great head. They

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keep still high up in the snow, coming down to graze during the night on the bare patches. No village sheep or goats have yet gone up, and the game has not been disturbed. The thaw is very rapid in the heat of the day, and in three days' time other grounds will be available further up the valley. Last year I saw a very great ibex of full fifty inches far up the valley near the glacier, and no Sahib came to shoot. It may be that he will be found again. To-morrow we will ascend above the village, starting an hour before dawn, while the *chhota* shikhari will go up the valley keeping to the south side, whence he can scan well the southern slopes. Two coolies with blankets and food can follow us to a spot I know of, where we will sleep. But the danger from avalanches will be great when the hard crust of the snow melts towards noon."

So it was settled while we chatted away for half an hour. I had a glass of hot whiskey and water, gave the rifle a last rub over, and smoked the evening pipe. Smoking does not go well with hard climbing and straight shooting, and while out I only permitted myself the luxury three times a day; one pipe after the early morning meal, one after the snack at midday, and one before turning in at night. A fourth was only indulged in when a head had been secured, sitting over the carcase while the necessary obsequies were performed. Those pipes to a confirmed smoker were no small thing, and the last especially was a joy! But it was early to rise next day, Doodoo was soon dismissed, and after warning "Ugly" to call me at 4 a.m., it was a case of "Lights Out."

I seemed hardly to have slept at all, when my servant appeared. I rolled out of bed, donned my shooting kit, and hastily put away all I could of hot curry and tea, well knowing how desperately hungry I would be before nightfall. Doodoo took the rifle, telescope and glasses, the grass shoe coolie carried a wrap for each of us and some spare grass shoes, and with a few cartridges, a pipe, tobacco and matches, and a little food in my pockets, off we started. A pair of woollen gloves and a stout seasoned khud stick of wood like hickory with a miniature spade at the end for cutting footholds completed the outfit.

The first thousand feet up after a heavy meal is always a grind. You have to get your second wind at climbing like anything else;

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you kick your toes against stones in the dusk until you learn to pick up your feet, for grass shoes give them no protection. You start off cold, and soon become uncomfortably hot; the coat is stripped off and chucked to the coolie, but still the perspiration pours off you. The more rarified the air, the greater the exertion. If the going is at all difficult, a thousand feet up in an hour is not a bad average, including a short pause now and again, and it was a good three hours before we reached the foot of the grass *mergs*.

We were now on our shooting ground, forced to quit the friendly cover afforded by the edge of the *parris*, and it behoved us to go warily. For a considerable distance right and left, the bare *mergs* sloped down very steeply, the surface relieved by shallow depressions, with here and there a great furrow, scoured out in course of time by small mud floods and avalanches, with faces as smooth as glass of hardened snow or earth, about thirty feet deep, and difficult or dangerous to cross. Outcrops of rock in places tended to localize these channels. Snow lay wherever there was a little shelter from the sun.

Spying from point to point, the ibex were located in an hour, well away to our left, and already ascending slowly for the day, grazing as they went. We at once decided to work up by our right, and seek a favourable opportunity during the afternoon, when they should come down again.

The going on the beaten and steeply sloping grass was very slippery and wearisome, and as we proceeded upwards the snow became continuous and ever deeper. Several times we had to cross snow shoots, and were very nearly caught in one. After a good look up, we were both well in it, when a ball of snow a foot in diameter, and rendered as hard as ice in its course down, ricochetted over our heads like a flash. Others followed, great and small, and we only retraced our steps just in time to avoid a small avalanche, which swept down the shoot from lip to lip with tremendous velocity and much noise. As an avalanche it was only a small affair, and as the day advanced the rumblings of such falls could be heard in many directions. If the locality was realized in time, the puffs of snow cloud could be distinguished, as the snow was precipitated over the edge of the cliffs into the rock faces and nullahs far below.

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We persevered upwards till about 11 a.m., when we were 500 to 1000 feet above the snow line, and often waist-deep in it. The ibex had been kept under observation from time to time, and were now lying down, still considerably above us. As they were up valley of us, and the wind blows by day up the valley, as well as up the hill, we could make little ground towards them, and there was nothing to be done except to wait until they descended below us in the afternoon. We accordingly settled down under cover of a friendly ridge, taking turns to remain on watch. I beat out a short track in the snow on which to exercise for warmth, stripped off my wet shirt, and hung it up to dry. It was then resumed and I crept up to Doodoo to have a good look.

More of the herd were now to be seen, though others doubtless remained concealed in the folds of the ground. Two heads judged shootable were visible. A few females stationed on the outskirts of the herd were obviously doing sentry, while the little ones frisked about among the rocks. It is one of the greatest pleasures of stalking to watch wild animals thus at play.

The length of an ibex's horns can with a little practice be accurately judged by the extent of the curve, especially with the aid of a good telescope. If the points curl well round to his back when the head is raised, the horns are likely to be just about 40 inches round the curve, which we regarded at Gilgit as the minimum shootable length. If the curl was well continued towards the withers, the head was sure to be a fine one, perhaps 45 inches or even more. A 40-inch ibex is as good a trophy as a 45-inch markhor, and a 45-inch ibex as a 48-inch markhor. An ibex over 45 inches was accounted an exceptional head. Ibex of 55 inches and over have been shot in Central Asia, and two of 53 and 55 inches were shot some years later by Captain B. E. M. Gurdon near Gilgit; but as a rule they do not seem to run so big south of the main Kara Korum—Hindu Kush range.

These long midday waits stalking are apt to be very tedious. We were up somewhere near 12,000 feet, and however powerful the sun's rays, the wind off the snow was certain to be very cold. Having seen all there was to be seen of the ibex, I retired to the most sheltered nook I could find, wrapped myself up in my *choga*, and lay long admiring the gorgeous panorama spread out before me.

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Some of these views were truly marvellous. Here, away to the south, the great *massif* of Nanga Parbat, 28,000 feet high, reared itself against a cloudless sky, looking entirely worthy of its other name of "Peristan," or Fairyland, by which it is known from Kabul to the Punjab.

The inhabitants of the valleys round about it believed firmly in the Fairies, and used to tell me many tales of them. It was death for humans to enter their domain, and when the Alpine Expedition, led by Mr. Mummery in 1896, came up to attempt its conquest, some of the natives came to me near Astor, and begged me to warn the Sahibs, as assuredly the fairies would take vengeance on their temerity. Later, after Mummery and the two Goorkhas with him had been lost and no trace of them could be found, I met several of the same natives again, and they reproached me with not having persuaded him to desist from his object.

Others pointed out some of the dwellings of the fairies high up in the mountain fastnesses, and assured me that in times of storm they had seen the "Peris" come out and dance in the snow to the music of tom toms.

In the more immediate neighbourhood, the peaks on either side of Naltar Valley rose to 20,000 feet, and all was ice and snow, while far away below the village was visible, an oasis of pink blossom.

The *mergs* above Naltar were a favourite haunt of the great Ram Chikhor, the Snow Cock of the Himalayas, and my attention was frequently diverted by one of these birds, as big as a turkey, as with a long drawn out whistle, he would plane down from above without a flutter of his wings, and wheel away along the hillside, sending my thoughts home to the old cock grouse sailing away with a derisive crow down the heather clad mountains of Tyrone or Donegal. Another time Doodoo nudged me gently, and directed my eyes down to where an old hen with her brood of chicks following her in single file through the snow, was padding it up the hill, blissfully ignorant of the presence of an enemy within twenty yards as she passed us. But it did not do to be spotted by the ram chikhor; I am convinced they had a warning cry, which alarmed other game.

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When tired of every thing else, I produced a well-worn copy of Shakespeare, my constant companion out shooting, for in a land where books were not easily obtainable, I never got to the end of it, and it always had the desired effect of sending me off to sleep after the exertions of the morning. In between times a frugal lunch and the longed-for pipe. As the time approached for the ibex to move, interest revived.

About 3.30 they became restive. More and more animals appeared from nowhere, and the first began to edge off down hill. The sentinels stood up and gazed fixedly down and to the flanks, but practically not up at all as the more wily markhor will. Then one or two of the bolder would make a little dart down to where some coveted bit of grass showed. These rushes became more frequent and longer, and lastly the old bucks got on their feet and followed well in rear. When we thought they had all gone, the biggest head we had yet seen slowly emerged from behind the ridge, and after peering down for a few minutes vanished with a rush.

We reckoned he could not be less than 45 inches, and at once selected him as our quarry.

The ibex were now below us, and after waiting another half hour to make sure the coast was clear, we began to work our way from ridge to ridge downwards and towards them, making for a point whence we judged they would be visible.

But here further progress was barred. The ibex were there right enough, but any advance on our part would be in view of the ever alert sentries. There was no sign of the big one, and the nearest females were still several hundreds of yards away.

The minutes passed, the sun got low and vanished, the valley already seemed in the dark, and the shadows crept up steadily towards us. Soon there would be no light to shoot. A puff of icy air coming down hill warned us the wind was changing. It was succeeded by a report like that of a gun from across the valley; it was a rock being rent asunder by the freezing of the water, which by day had percolated into some crack.

"Come, Sahib, let us be gone," said Doodoo, "it is useless to remain longer. Assuredly those *madines* are the daughters of the Devil. Thus it is shooting; perchance to-morrow our kismet will be good."

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The short twilight had come to an end as we reached the rendezvous, well sheltered from view from above, and the coolies had got a fire going. It was the work of a few minutes only to pitch the small seven pound tent I used on such occasions, and the hot pot containing several days' rations was soon steaming. The meal over, the programme for next morning was discussed over a glass of hot whiskey and the evening pipe; but the night wind cut like ice, and we were soon all curled up in our blankets.

We were up at the streak of dawn, and after fortifying the inner man, the coolies were told to return to the village and wait there till summoned; but if any news came in from the second shikhari, it was to be sent up at once. The other three of us then made cautiously for the point from which we had last seen the ibex.

It was only to be expected that they would have shifted their ground a bit during the night; but for two hours we coasted carefully along the mountain side without seeing a sign of them, and it became obvious they must have been disturbed. It was not till 10 a.m., when we were about to give them up, that Doodoo spotted the herd in very difficult ground, higher up than ever, and quite unapproachable.

"The *kail* have been alarmed, Sahib. It must be that there is a snow leopard, the offspring of the Devil, about. No one besides ourselves has been on the mergs, and the light of our fire could not have been visible. If a leopard has killed, they will not descend for some days; otherwise it is possible they will do so either to-day or to-morrow."

We had come a long way, and the grass slopes did not extend for more than a mile in front of us, ceasing abruptly in a series of bad *parris* on the flank of a projecting shoulder from the mountain above. Here, in ground where only such animals could have found a footing the ibex had taken refuge.

"Doubtless it is so, Doodoo. But if those ibex descend again this side of the spur, the opportunity will be good. If we advance further we shall be seen, and they will disappear over the spur, where we cannot follow. There is no other ground in this neighbourhood where we may find ibex; neither as yet have we any message from the *chhota* shikhari. Moreover without the coolies, we of ourselves cannot transport everything down hill. Therefore

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for to-day and to-morrow let us watch these ibex; to-morrow early the grass shoe coolie can summon the men, and if the ibex are still frightened we will descend to the valley, and seek the *chhota* shikhari and new ground."

So it was settled. We selected a good spot somewhat higher up from which to observe, and made for it under cover. As we neared it, we came on the fresh pug marks of a snow leopard.

"See, Sahib," said Doodoo who was in front, "it is even as I said. Owing to this one of unmentionable forefathers, the ibex have eluded us. May the curse of Allah be on him!"

Snow leopards do their hunting by night, are very seldom seen, and are exceedingly wary. Only twice in many days had I ever seen a snow leopard; once when out with a shot gun after chikhor, when a native pointed out a malevolent looking head like a gargoyle of Notre Dame regarding us from over a rock fifteen hundred feet above, and once when my shikhari showed me a cat-like form slinking along among some rocks also a long way off. But there is no trophy more prized than a snow leopard pelt.

"Doodoo," I said, "I have always promised you 20 rupees *backshish* for a 48 inch ibex. I will give you the same if we bag a snow leopard. I have heard the best way to get one is when an ibex has been shot. If the carcase is left to lie for the night, without anyone going near it, and so tainting the ground, it is possible a leopard may be found feeding on it at dawn. This we will try, if perchance we succeed in shooting an ibex in this place. But inasmuch as you and the others will then not be able to eat of the flesh of the ibex, by reason of its not being *halal* (i.e. made lawful for food according to the Koran, by having the throat cut *before it is quite dead*), you can arrange when we return to the village to purchase a goat instead, and there will also be ten rupees *backshish* to be divided among the others."

The bribe was sufficient, and the good Doodoo appeared satisfied. For it is no small thing to interfere over the eating of anything shot. The chance of an unlimited gorge on meat is one of the greatest inducements to the poor villagers to accompany one out shooting, for they very seldom slay their goats and sheep, which are kept rather to supply milk and wool. There is never the slightest difficulty about imagining for the purpose, that any

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game, shot as dead as mutton, or which perhaps has fallen down a thousand feet of khud, still retains sufficient life in it to make it a lawful sacrifice, as ordained by religious law. Otherwise how could the blood still be warm, and flow?

All that day we lay freezing in the snow, but the ibex did not budge. At dusk we returned rather disconsolate to the bivouac; two days of the invaluable leave had been spent so far in vain. Next morning the grass shoe coolie was despatched to bring up the others that evening, and Doodoo and I returned early to our vantage point. The ibex were still in the same position and showed no inclination to quit their fastness.

We passed another very cold day, cursing all snow leopards and animals of undesirable descent; even Shakespeare failed to send me to sleep. But about 4 p.m. Doodoo, who was looking out, turned his head with a smile, and beckoned me up beside him.

"The ibex are about to move, Sahib. Already many have risen and are restless, and two or three of the *madines* have descended a few yards."

It was so indeed. During the next hour, led by the more venturesome females and gathering courage as they went, they gradually descended, until they reached the *merg*, and began to disappear again in a depression. The old bucks came last, and we were able to recognize the head we wanted.

After a last careful scrutiny of all the ground, we hustled over the brow of the little spur we were on, and made for a spot on our side of the dip the ibex had entered, floundering through the snow, regardless of avalanches.

It was 5 p.m. by the time we arrived just below our objective, sweating and out of breath.

"Go you up and look, Doodoo, while I get my wind, and prepare the rifle."

I sat down, pulled the old Winchester ·500 out of its case, and inserted three cartridges in the magazine and one in the breech. Then for five minutes I practised drawing a bead, till Doodoo returned.

"The ibex have descended rapidly, Sahib, and are below us, too far for a shot. We must follow them down."

I removed the round in the breech, and we made best pace

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down our side of the spur. But the more haste the less speed! Tripping over something in the snow, I took a header into a drift, rifle and all. Pulling myself out, I found the muzzle had got plugged up with snow. Luckily I carried a pull-through, and was relieved to find the weight passed down the bore and out from the muzzle. Had it not, the barrel might well have burst if fired. It only showed how stupid it was to take the rifle out of its case until ready to take a shot.

Doodoo peered over again, and this time motioned me to join him. I slipped in a cartridge, pulled my cloth cap down over my face, and wormed my way up.

"The big ibex is yonder, Sahib, the telescope is laid on him. You will not get a better shot."

I judged the distance between a hundred and fifty and two hundred yards, further than I liked, and it was a down hill shot. But the light would soon fail, and there was nothing else for it. Taking careful aim I fired.

"Nahin Luggya, Sahib!" said Doodoo, as the ibex scattered away like the wind up the khud, "I saw the strike of the bullet above him."

Cursing my lack of skill, I jerked a fresh round into the breech, and scrambled on to my hunkers, with my elbows on my knees, a favourite position, ready for a second shot, but too excited.

The ibex had disappeared over a rise, to appear again over three hundred yards away going almost in single file in bad ground. At one place they had to make a long jump, and as they came up to it, each checked for a second or so. "Shoot, Sahib, when you see the big one come," whispered Doodoo, and I yielded to the temptation to fire an inexcusable shot.

It was a case of the running deer at 400 yards; the three bucks came along together. As the big one paused, I fired. He jumped across and fled on, but to our astonishment, the one immediately behind him also jumped, and fell, crashing down forty or fifty feet, and lay motionless.

"*Dusra mara*, Sahib," shouted Doodoo excitedly, "you have hit the next one!" and there was no doubt about it; really an appalling fluke, and nothing whatever to be proud of. It was devoutly to be hoped that it was a head worthy of being shot;

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as far as we could see with the telescope it appeared so, but he lay at an angle.

"Now Doodoo it is late. Remember at dawn to-morrow we will seek a snow leopard on the carcase. Therefore let us make such arrangements as are possible, so that we may pass the night somewhere here. We shall not be able to return to the bivouac."

"If the Sahib wishes we will do so. But here in the snow we shall be frozen. It will be necessary to descend, and find a spot where we can light a fire. We have no blankets and no food. The coolies will perhaps seek us, having heard the shot, but they will not come so far. There is a place I know of not distant, where the herds gather the goats by night."

About a thousand feet lower we found a big rock with a low stone wall round it, fairly sheltered and screened. In the failing light we gathered some sticks and dry grass, made a fire, and lay down in our chogas. But I don't think either of us got much sleep. The cold was intense.

Before dawn we were up, replenished the fire to warm ourselves and started off. The going was bad, but as it got grey in the east, we reckoned we were not more than two or three hundred yards from the ibex. Doodoo with his unerring sense of ground led slightly, scouting very carefully, and eventually halting under cover of a low rocky spur.

"From the ground above we should be able to see the carcase, Sahib; there is still not sufficient light to shoot, but I think we are not much more than a hundred paces distant. Prepare the rifle, and we will crawl up."

My hands and feet were like ice, and after attempting to restore some circulation, I wormed my way up with the shikhari, and lay prone, just able to see over the top. We were close under the *parri* where the ibex had fallen, but everything at first was indistinct. Gradually the light improved.

Doodoo kept edging forward. At length he paused, drew back, and whispered excitedly: "I have seen the ibex, Sahib, and undoubtedly there is some animal feeding on it. Creep up level with me, and wait for the light to improve."

I did so, forgetting all about the cold. It was some time before I could distinguish anything. Then about a hundred yards

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away I made out something which moved occasionally, and as the light cleared, I saw not one, but two, grey objects worrying at the ibex. There could be no doubt they were snow leopards.

The minutes dragged by, but dawn comes up quick in the east. The glasses were brought into requisition, and all doubt vanished. I noted which seemed to be the larger (the male), brought the rifle to bear, and laid a bead again and again. Then, when they appeared distinct over the sights, I aimed low, and fired very carefully.

"Shabash!" cried Doodoo, "one of them is hit!"

I just saw the other dart away, and fired an ineffectual shot. The first lay kicking on the ground, and I prepared to shoot again. But he soon ceased to move, and lay apparently dead.

We hastened forward, and there sure enough lay a fine snow leopard dead below the ibex, which we found had been shot through the neck, and measured 42 inches. It had been worth it all.

I sat down and smoked a pipe, while Doodoo proceeded to decapitate the ibex, a rite never to be delegated into the hands of the ignorant. Even with a shikhari it is always advisable to superintend the first incision; otherwise the head is too often taken off just behind the skull, so that the mask is quite useless for mounting. The leopard we decided to have carried down to the village, where the important operations of skinning, cleaning, pegging out to dry, etc., could be carried out unhurried, and with such skill as was available.

I then started off for the bivouac, hoping to meet the coolies on the way, attracted by the shots, leaving Doodoo to guard the spoils till they arrived. It is no easy matter finding one's own way along a steep mountain side when unacquainted with the ground, and I was badly at fault and about to retrace my steps when a shout from above directed me to make straight up to where I could see the men.

They told me they had been much agitated at the non-return of the Sahib the previous night, but it had been useless to try and find us with food and blankets when darkness came on. They gave me a message from the second shikhari, that the snow was melting fast up the valley, and that he had spotted game and was remaining

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in observation. They then directed me to the bivouac, and I sent them on to Doodoo, saying I would await him there

It did not take long to kindle a fire on the embers, heat the hot pot, brew some tea, and satisfy the appalling emptiness within. Doodoo turned up shortly after carrying the ibex head, and he also satisfied his hunger. Then, shouldering what kit we could, and leaving not more than one man could manage (two coolies would be needed for the leopard), we descended to the village.

It was 2 p.m. when we arrived; but it was also the fourth day of my precious leave. So although we were both very tired we gave strict injunctions regarding the skinning of the leopard, got fresh coolies and some extra kit and rations, left instructions for the grass coolie to join us next day, and set off to meet the *chhota* shikhari.

II.

Dusk was closing in. We joined the shikhari at a beautiful spot some eight miles up, and on the south side of the valley. Here, in a sweet-scented glade, where "cedars mingled with the pines," the ground, carpeted deep in soft silvery edelweiss, sloped gently down to meet the stream, whose noisy song rose to blend with the lullaby of the wind in the trees above. It was a dream of a place to rest in. The *chhota* shikhari reported he had searched the ground on the north side of the valley (i.e. the southern slopes) from high ground on the opposite side. He had located two separate lots of ibex, but at that distance, with only binoculars, he could only state that there were a number of bucks in each. The snow line on the southern slopes was in places nearly three thousand feet up. We settled to ascend sufficiently the next morning on our side of the valley to obtain a good view with the telescope, and to be guided by what we could make out.

Next day we climbed a fairly high spur, which jutted out a little above our camping ground. From the top I was amazed to see on the other side a considerable nullah, about three hundred yards across, filled to within a hundred feet of the lip on each side by the snow and debris brought down by a great avalanche. The snow had flowed on out of the nullah into the main valley, and formed a white ridge several hundreds of feet high right across it,

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under which the stream had burrowed its course. For forty feet above the then level of the snow in the nullah the rock had been swept clean of earth and trees; above this again for another fifty feet of height, the great pines had been broken off twenty feet above the ground like twigs, but there were no signs of the upper portions of the trees. The grass had not been disturbed.

Doodoo told me that the summer before there had been an extensive avalanche high up along the sides of the mountains above the nullah. The snow had come down with irresistible force, carrying all before it. The rush of the wind propelled in front by the snow had been so great that it had snapped the trees off on either side of the nullah as we saw them, and carried the tops away into the valley. Two men from the village, who had been herding goats on the spot had never been seen again, but the *choga* of one had been found high up in a tree a mile away. The avalanche had been due to the slight layer of earth, under the snow and over the rock of the mountain side, becoming saturated with water, and slipping under the combined weight of water and snow.

I looked again, but I could discover no signs whatever of any snow having passed over the ground under the broken trees. It seemed as if it had been as he said.

Something of the same sort must occur when one of the great mud floods comes sweeping down from the mountains, except that the snow is all melted. Whole villages with their fields have been buried feet deep by them.

We spotted one of the lots of ibex reported by the second shikhari, but of the other we could see nothing. The first were for the moment in what looked like easy ground, broken by small nullahs, the lower portions of which were fairly clear of snow, the whole being overhung by nasty-looking cliffs. We decided to go after those we could see, though at the distance we could not make out any particular heads. Having settled our line of approach, we started at once.

We were level with where we had marked the ibex down by about 3 p.m., and then worked cautiously towards them along the hill side. As we came over a rise, we heard the warning cry of a female, and saw the herd bolt round a corner, apparently making for the cliffs. There was no shootable head among them.

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"Let us follow them, Sahib," said Doodoo, "I know this bit of ground, and will show you a very rare sight. The ground is so difficult in those *parris* that even ibex cannot traverse them, and you will find the whole herd unable to proceed further. Once before when out with Gray Sahib, I have seen the same thing in this place."

Doodoo was quite right. When we turned the corner we came on about thirty ibex, including some small bucks, held up in the face of the cliff between one and two hundred yards away, looking in our direction. Though we made noises to frighten them, they dared not go on. I could have picked off every one in turn.

Another day had gone, and I was only one ibex up. The next morning we started to go further up the valley, to look for Doodoo's big ibex, but settled to try for anything in the way of a good head. We saw nothing that day except a red bear, just out of his winter retreat, with almost a silvery coat. I had never shot one, and felt greatly tempted. We bivouacked out within sight of the great glacier.

Naltar Nullah so far had not come up to expectations in the ibex line, and six days of my leave were gone. The aspect of the valley had changed somewhat where we now were; the lower flanks were generally rocky, interspersed with less difficult ground where only a limited area for grazing was available in bare patches. Above this, on the south slopes, the ground receded less steeply, but all seemed under snow. Doodoo stated these upper slopes were the best in the whole valley as soon as the grass began to appear, and that even now they should attract game, as the snow covering would be thin in places, and the sun had sufficient strength to make the herbage shoot underneath; it was possible the snow might be disappearing here and there, and a slight layer would not prevent the ibex getting at the grass. We could not command a view over the upper ground from our side of the valley without great trouble in the deep snow, and decided to see what we could do by ascending on the other. The disadvantage was that we should have the wind unfavourable.

After a preliminary reconnaissance the next morning, which resulted in nothing, we crossed over and started up. We had not so far to climb, but keeping to the cover of small nullahs the snow

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rendered the going very laborious and slow. It was well after noon as we approached the edge of the *mergs*.

But there were no ibex to be seen on them. Some rising ground four or five hundred yards in the direction of down the valley limited the view, and having selected our next point, we made for it, keeping always under cover in the steeper slopes.

We were just coming up to our objective, when a female started up less than a hundred yards in front; for a second or two she stood looking at us, then uttered her note of alarm, turned tail and vanished. We struggled forward for a better view, Doodoo as usual in front and I immediately behind getting the rifle out of its case. Suddenly the shikhari dropped, and gesticulating wildly to me to look to my left, whispered: "The big ibex, Sahib! Shoot quick, or he will be off." He then whistled several times.

Bending low, I struggled a few paces forward, stood up to look, and saw a magnificent ibex with his head turned towards us, about 150 yards away in some rocky ground. I took rapid aim and fired. But out of breath in the rarified air, and with my hands like ice, I missed him clean. He disappeared over the spur, to become visible again half a mile away, going like smoke.

We examined the snow where he had stood, but there was no blood. Doodoo was greatly put out: "That was truly a great ibex, Sahib. If the wind had been favourable we should have got a better chance. You will never see another like him!"

I cursed my luck, but could not reproach myself for having missed under the circumstances. Yet that was the finest head of any kind I saw during the whole of my time in Gilgit, and it was something even to have seen it. I do not think he was ever shot.

A little further on lay a stretch of unusually level *merg*, and on it we found a circular patch about thirty feet in diameter, clear of snow, where the grass had been trampled down into the earth. I stopped astonished, and asked Doodoo how it came there.

"Sahib, this is a spot where ibex have passed the winter. They do not go down when the snow comes, but collect in places such as this and let the snow cover them completely. The heat of their bodies melts the snow about them, but the crust above freezes. Thus they remain, feeding on the grass and moss beneath them, and making tracks for themselves under the snow."

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I examined the spot closely. There were large accumulations of ibex droppings, and the soil was churned up with the marks of their hoofs. Two separate tracks, three or four feet wide, also bare of snow and trampled down in the same manner, led away in different directions.

I remembered that once Abdur Rahman, the great shikhari with whom I shot all the winter, when returning one day in April the year before from markhor shooting, during a short halt on the Hunza road, had called me over to where he had been occupying the time spying with the telescope. He had scotched it up with stones on a rock, directed on some *mergs* high up and in deep snow.

"Look closely, Sahib," he had said, "I have told you that ibex remain up in the snow during winter. You will see a line across the snow on the *merg* like a track; if you follow it carefully, you will see the horns of ibex showing above it, as they move along. It is an ibex path which has half thawed through; their bodies are still concealed, but their horns show above the snow."

I had always doubted the possibility of his statement that ibex dwelt under the snow in winter; but through the telescope I distinctly saw the ibex horns showing above the line in the snow and moving along, as he said.

I have never seen this habit of ibex alluded to in books on shooting, if it is a habit of theirs. It seems strange, but I only mention what I actually saw on two occasions. To verify this, one would have to be out after them early in the spring, before the majority of sportsmen from India can obtain leave to reach the shooting grounds. I would very much like to know if anyone can confirm what seems a very interesting habit.

We saw no more that day, the sixth of my leave, and had no better luck during the next two, spent far up the valley in the vain hope of seeing something of the big fellow I had missed. On the ninth day we began to retrace our steps towards Naltar, still keeping to the south side, and spying the opposite slopes.

About 11 a.m. we spotted a fine herd almost opposite to us in what looked like fairly easy ground. They were then lying down for the day along the snow line, about two thousand feet above the bottom of the valley, and included a number of bucks, though at the distance we could not make out more.

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While eating our lunch, we decided on our line of approach, which entailed a detour up the valley, and an ascent up the far side of a biggish spur free of snow. Till we got well onto the spur we reckoned we could not be discovered, and from there proposed to scout up wind towards them.

About 3 p.m. we were ascending rather casually, not thinking we were near the ibex, Doodoo and I about level in front, and the grass coolie slightly behind. We topped a rise, when Doodoo pulled me down and whispered: "The ibex have moved, and are just in front. Get ready the rifle."

Slipping a round into the breech (the magazine was always charged), I peered cautiously over a rock by the side of the shikhari. A number of ibex were standing looking towards us from varying distances up to 150 yards, very much on the alert. Several likely looking heads were grouped together about the centre; there was no time to discriminate, and as I scrambled up on to the rock to see over the sights, I mentally selected what I thought seemed a good head. I sat down in my favourite position, the elbows resting on my knees, while Doodoo kept the binoculars on them and began to whistle, which had the desired effect of arousing their curiosity. Taking, I suppose, rather a hasty aim, I fired.

"Missed again, Sahib," said Doodoo.

It was extraordinary how often I *did* miss with the first shot from that dear old gun, which had been given me by a fellow I was very fond of when he left Gilgit, but which had a great reputation for shooting straight and killing. But there was a note of almost contempt in Doodoo's voice, which riled me infernally, and I swore inwardly I would get even with the ibex and with Doodoo. After all, he had brought me on them unprepared.

Reloading on the most approved style as laid down for "Rapid Fire," I got a sight again on the same ibex as they turned and fled. This time I knew I could not miss as the rifle rang out.

"*Shabash*, Sahib," cried Doodoo excitedly, "he is down. Take the next on the right."

Again I felt I was going to hit, and fired before they had covered thirty yards.

"He also is wounded, Sahib!" fairly shouted Doodoo. Now the second buck from the left."

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Out of the corner of my eye, as the smoke powder cleared away, I had seen the last stumble badly; it was the work of a few seconds only to load and aim at the third ibex, now nearly two hundred yards away, and about to disappear, but I was as firm as a rock.

"I think you missed the last, Sahib," reported Doodoo, "but one is down and another wounded. *Inshah Allah!*"

We hurried forward; the first ibex was already dead, but Doodoo at once proceeded to perform the indispensable sacrifice, and the blood flowed to his and the coolie's satisfaction. As a matter of fact it would in all probability have made no difference if it had not, for despite all their professions, these people are far from being strictly orthodox Muhammadans.

We then examined the ground where the second ibex had stood, and the blood left no doubt about his having been hit. Moreover his tracks led down, a sure sign that he felt unable to face the hill. Between the hoof marks and the blood, we had little difficulty in following him up, and after going less than a mile we came on him breathing his last below us. I had roughly spanned the horns of the first to measure 44 inches; this one I made 45. They were two really good heads.

"Never have I seen a Sahib shoot two such heads in like manner! *Shabash* Sahib!" said Doodoo, as he proceeded to work. But I still thought I had been onto that third ibex.

"We will leave this one to the coolie, Doodoo, while we go back, and see if by chance the third ibex also was hit. Tell the man to complete the removal of the head, and after covering the carcase from the vultures, to bring the horns into camp."

To Doodoo's surprise, we found several drops of blood where the last ibex had disappeared.

"Undoubtedly he is hit, Sahib," cried Doodoo, intensely excited. This one was not so easy to follow. There was very little blood, and he had travelled over rocky ground where it was more difficult to make out his tracks. But he also had soon turned down hill, as if badly hit and nearly done. A quarter of a mile further on we suddenly came on him lying down. The poor beast attempted to rise, but another bullet rolled him over. To my

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intense delight he measured about 47 inches, the biggest of the three!

I had gone up immensely in Doodoo's estimation! Even his hero, Gray Sahib, had never shot more than one ibex at a time; and here also was meat enough for the entire village. His own *izzat* would be greatly enhanced.

The three heads were brought in that evening, and a messenger despatched to bring men to collect the meat. I was due back in Nomal the next day, but our luck was still in, and on the way I bagged a fine red bear, with a beautiful winter coat. Leaving Doodoo to remove the skin, I went on alone, and reached my camp at Naltar at dusk. "Ugly" had already departed with the kit.

Confident I could find my own way down the valley, I set off, but was overtaken by darkness before I got to the descent of the old morraine. I got off the track, lost my bearings, and afraid of falling, was obliged to pass the night very cold and uncomfortable scotched up between two rocks. However, the satisfaction of having made a record bag made up for everything.

I reached Nomal soon after sunrise, dog tired, my face all blisters from exposure, and my hands raw. But after a hearty breakfast, a wash and shave, and half an hour's sleep, I managed to do a stiff day out on the hills with the battery. Such is the true joy of youth.

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BUFFALOES IN NYASSALAND.

By "Mercury."

THE year 19— before the War I saw an advertisement of a book called "Nyassaland for the Hunter and Settler." As I was at that time considering the advisability of settling somewhere outside the British Isles I was rather impressed by the title and bought a copy of the book. Nyassaland appeared to be a sort of hunter's paradise and a most excellent country to settle in. So I decided to go there and see for myself.

I landed at Chindé, a half Portuguese half British town at the mouth of the Zambesi, and went through a most ridiculous ceremony of landing in Portuguese territory and being transferred to the British location, by a few native porters carrying my luggage round the end of a fence which came down to the water's edge. Having performed this ceremony I went to a hotel to await the departure of the stern wheel paddle steamer which navigates the Zambesi. Chindé is a God-forsaken hole and I was glad when we left it. The journey up the Zambesi to the mouth of the "Shiré" is very picturesque but the mosquitoes are terrible. The river is very shallow at this time of year, August, and the navigable channels have to be selected by eye. The captain of the vessel was very good at spotting the deepest channels and got us to the mouth of the Shiré without running aground more than twice. Three nights were spent on this part of the journey and having reached the Shiré we embarked in house boats. These are pulled by a crew of about ten natives and the journey to Port Herald occupies a day and a night. The house boats are provided with camp beds and mosquito curtains, the latter an absolute necessity. My companion in the house boat and I landed on a sand bank for dinner but as we could not take our mosquito curtains with us we were eaten alive. We eventually arrived at Port Herald alive and well and

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spent the night in a hut. Next morning I was awakened by the reveillé which I had known so well in the Artillery, blown by native police trumpeters. I started for Blantyre by train some time in the forenoon and arrived there at 5 p.m. Blantyre is the commercial capital and I set to work at once to organize my expedition, collect porters, etc. This took a week.

My first march was 25 miles and having been told I could run down in an hour on a bicycle I bought one and, as I had never ridden one, started to learn in the open space in front of the hotel. It seemed easy enough, so I sent my camp on ahead and prepared to follow at my leisure—Next afternoon I started and soon found that the road, a mere wagon track, was quite impossible for bicycles except by the native footpath, which zig-zagged and twisted down the centre of it. I very soon found that I was not a trick cyclist and was quite unable to keep to the footpath. I therefore had to get off and lead the machine through a country supposed to be infested by lions. I had no rifle as I expected to complete the journey in daylight, but after it got dark and I heard lions from time to time, I cursed my folly in embarking on that bike ride.

I eventually got safely to camp, only to discover that I had entirely forgotton to give any orders to the cook about dinner. The cook, however, was equal to the occasion and produced some soup, which I am convinced was made from the feathers of a chicken which he produced to form the solid part of my dinner. It was better than nothing and I spent a mosquito-ridden night in camp and had no scares from lions. I don't believe there are a great many in this part of the country. Further north they are said to be really numerous, and it is stated that about 400 natives lose their lives every year from lions—I never succeeded in getting to this paradise so I cannot vouch for the truth of the statement.

After an uncomfortable night in camp I started on my expedition and eventually arrived at a dried-up swamp called Pamalombé south of Fort Johnson, which is at the south end of Lake Nyassa. Here I camped for several days, again many mosquitoes, and some tsetse flies, but I heard there were buffaloes about and set to work to look for them. I had a native hunter, a chief of sorts, a brave

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man but utterly ignorant about hunting. However, we found a herd of buffaloes, forty strong, lying down in the grass at 4.30 one evening. We lay down and watched them for an hour, waiting till they should get up and graze. I spent the time selecting the biggest bull and when he rose to his feet I put a bullet through the point of his near shoulder and through his lungs. He and the whole herd immediately bolted, and about 100 yards further away the stricken bull fell, and the herd went on. I immediately dashed out to give him a finishing shot if necessary. I had not gone fifty yards when I saw the whole herd coming back and advancing upon me from the left front, with their noses held up and out in front of them the way buffaloes do. I did not know quite what to do. I did not want to run as I thought this would bring the whole herd after me. My hunter kept on saying "They won't come, they won't come," though they looked as if they would. We inclined to our right in the direction of an ant hill which I thought would at least give some sort of cover in case of a combined charge. Having reached this in safety we found that it brought the fallen bull exactly between us and the advancing herd. We therefore climbed on top of it and awaited events. One bull, apparently the senior of the herd, advanced to the fallen bull, put his head down and sniffed him. He then retired twenty paces and charged the fallen tyrant full speed ahead. All the other bulls in the herd followed suit and the cows stood looking on buffalo-wise with muzzles in the air. This performance went on for five minutes and all I could see was a whirling ring of buffaloes nearly hidden by dust. I took a snap shot at one as he galloped round but I think I missed. Anyway the herd bolted straight away at the shot. Five or ten minutes later I saw one or more advancing again and took a long and hasty shot at the chest of the leader, which missed under. This sent them off for good and I went out to examine my prize which was now quite dead. It turned out to be quite a good head—I have forgotten the actual measurement, but somewhere a little under fifty inches.

I mentioned this incident to various settlers and one and all said they had never before heard of a similar case—buffaloes attacking a fallen one. One man suggested that they might have been trying to help him up. That may have been the idea in their

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heads of course, but it certainly did not look like it. It looked very much more like the younger bulls of the herd trying to get a bit of their own back from the obviously master bull of the herd. This fellow had probably bullied them in the past.

So much for one of my hunting experiences in a country where sport is good and fairly cheap. But settling there is another matter. There are too many tsetse flies and too much sleeping sickness. The climate in the low country is not pleasant but at an elevation of 3000 feet it improves and there are no tsetse flies.

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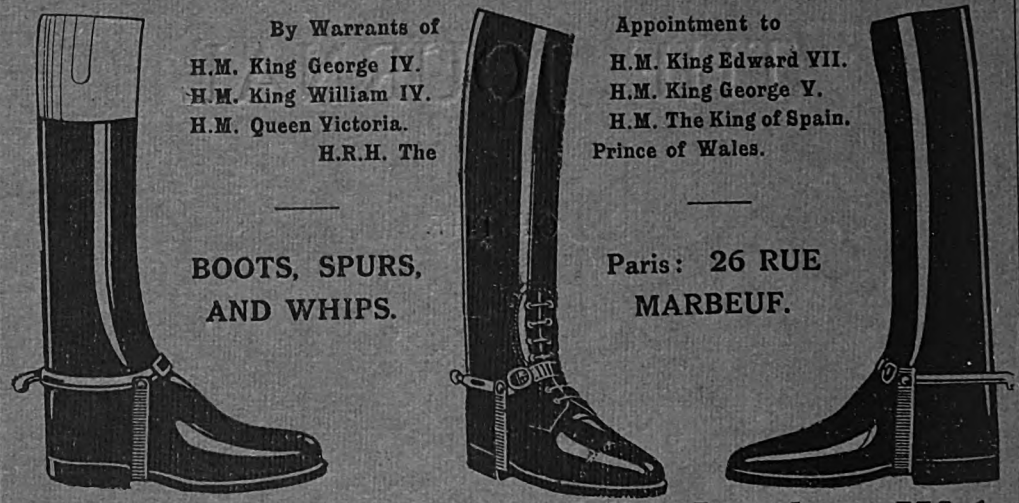

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"DUNCAN" GOLD MEDAL ESSAY, 1929-1930.

"Discuss the effect of the introduction of Radio-Telephony between Battery and O.P. on the Equipment, Organization and Employment of Artillery in the Field."

BY MAJOR P. I. NEWTON, D.S.O., R.A.

"GREAT EXPECTATIONS."

DREAMS cannot picture a fairer prospect than that which unfolds itself before the battery commander who is relieved of all anxiety with regard to his communications between O.P. and battery position. No more laying out miles of wire, or worse, reeling it in; or worse still, searching for and repairing a break, while targets, hitherto undreamed of, pass unscathed in endless procession before his longing eyes. No more hectic endeavour to find an O.P. from which both target and battery areas shall be visible, and which at the same time shall remain undiscovered to the enemy. Instead—communications, immediate and reliable, magically established by the wave of a wand, and without any limitations being imposed by the positions of battery and O.P. or by the nature of the country between them.

Was it some such vision as this that appeared before the dazzled eyes of those who set the problem we are attempting to solve? Do they contemplate the provision of a "Wireless" so perfect that it can be safely adopted as the only communicating link between a battery and its O.P., or do they, rather, look upon the introduction of radio-telephony merely as an adjunct to existing methods, or as a possible substitute for one or other of them. We shall have to examine this in some detail later on, when we are dealing with questions of alterations to equipment, but in the meantime we must accept as a basis for discussion of the general aspect of the problem, that we shall possess an apparatus at least as reliable as the telephone with its long and vulnerable wire.

Equipment, organization and employment, the three points of view from which it is desired to examine the probable effects

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upon artillery, have so considerable a bearing upon each other, are, in fact, so intimately related, that it is impossible altogether to isolate them. It is proposed therefore to treat them together and to arrange the argument on the following lines.

To consider the establishment of R/T between O.P. and battery position :—Firstly.—With regard to some aspects of its effect upon employment, noting, in the process, the resulting alterations likely to become necessary to equipment. Secondly.—To attempt some summary of these alterations to equipment, and to adventure some suggestions for the future. Thirdly.—To summarize the combined effect, upon employment, of the introduction of R/T itself and the resultant alterations in other equipment. Lastly.—To discuss the organization best calculated to give effect to the suggestions already put forward.

I. Some aspects of the effect upon the employment of artillery of the introduction of R/T between O.P. and B.P.

It will be generally admitted that in the past artillery tactics have been slow to take advantage of the best means of communication available; it is certain at any rate, that the telephone was invented long before TOB, and it needed the South African war to bring out the value of covered battery positions, and the consequent necessity for some form of link between them and their O.P's. A previous writer[1] in the Journal of the Royal Artillery has asserted that our nervous system as a regiment is in danger, and it is certainly of the highest importance that there should be no waiting this time until a war forces us to take advantage of the benefits which may accrue from a proper development of the use of "Wireless".

Some results of adopting a system of communication which is dependent on nothing but the contents of a readily transportable box occur to the mind at once, and may include the following :—

(a) Observed fire becomes a practical proposition far more often than at present, thus tending to reduce the importance of survey work and predicted shooting, except where surprise is the primary object in view.

[1] "Communications and Close Support" by Captain C. T. Beckett, M.C., R.A. April, 1928.

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(b) Close support can be given to infantry without the necessity for bringing guns into the forward areas.

(c) There is no need to move guns at all, as long as their target area remains within their range, or until enemy action forces it.

(d) Anyone can call for fire from any battery, if he knows the wave-length it is working on.

Of course what is true for us is also true for the enemy, and any alteration in artillery employment must be due rather to changed relations between the various arms of the same force, than to any unforeseen advantage likely to be gained over our opponents.

Let us therefore examine the four theories set out above in rather greater detail. And if at the same time we consider their probable bearing upon equipment, we shall be in a better position to make suggestions under that heading later on, than if we attempt to treat it separately.

(a) *Probable increase of observed as against predicted shooting.*

This is true. And although predicted shooting at the commencement of a "set-piece" attack, or for purposes of defensive barrages and counter-preparation fire, where 90% of its effectiveness lies in its element of surprise, can never be superseded by observed fire; yet the scope of the latter, in such phases of battles as advanced guard actions, exploitations of successful attack on the enemy's first defensive line, and defensive shooting into allotted zones during the early stages of a hostile attack, seems likely to be so far extended as to suggest economy, not only in ammunition, but also in the number of guns required to fire it. Barrages, concentrations and the like, be they never so carefully prepared, are bound to be wasteful, in the weight of metal they must inevitably plant upon unoccupied territory. There is no suggestion here for a reduction in the strength of our divisional artillery, which, as everyone knows is inadequate as it is; but turn to such a pronouncement as may be found on pp. 188 and 189, Artillery Training, Vol. III, 1928, viz. :—

"In battle, the necessity of employing every available gun, in order to give full support to the other arms, will often render the

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retention of artillery in reserve inadvisable in the case of divisions or smaller formations, but a commander must so adjust the tasks of his artillery as to make a portion of it readily available for employment against new targets which present themselves as the battle develops".

How much easier would become this commander's task, and how improved his sense of security, could he, in fact, retain some of his guns in reserve on wheels. Perhaps the introduction of radio-telephony may enable him to do so.

(b) *Close support for infantry can be given from guns not in the forward areas.*

Were this true in its entirety all our difficulties would disappear as if by magic, but unfortunately it is not. Artillery, far back, can never give adequate support against a tank attack on the front line, nor can they support their own tanks operating with anything but a strictly limited objective. Nor is the accuracy of guns at long range sufficient to enable them to deal successfully with the very small targets presented by concealed machine guns; moreover such targets can often be seen only from one particular spot, to which the delay in re-establishing communications even with R/T, might be just enough to render the subsequent fire useless, or perhaps worse than useless. Consequently, there still seems to be a role for anti-tank and close-support weapons in the hands of the infantry themselves or in very close touch with them, and for a special weapon for close support of tanks in attack. This theory is, however, partly true, and infantry are likely to be far better supported by the guns in rear than they have ever been before.

(c) *Guns will have to be moved less often than formerly.*

To move artillery in daylight, in these days of aeroplanes is always difficult and often dangerous; so here is a very real advantage. It does not in any way affect the principle of siting guns in depth, but it does call for increased range if it is to be exploited to the full. Now generally speaking, the bigger the gun the longer the range, and the longer the range the bigger the area available for a given number of battery positions. Mechanization has already done much to kill the bogey of weight behind the team, dare we hope that R/T will complete the work begun by the introduction

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of platforms, and dispose of his twin brother, "weight in action"? If so we may contemplate a divisional artillery armed with rather heavier weapons than those to which we have been accustomed, and as a result becoming independent in small actions and no longer requiring the attachment of, say, a 60 pr. battery to assist them in coping with hostile guns.

(d) *Anyone able to call for fire from any battery.*

Coupled with the increased range of modern and projected weapons, this opens up immense possibilities. One can even conceive of an expert linguist persuading the enemy artillery to open fire upon his own infantry. It lends itself, if considered otherwise desirable, to economy in F.O.O's; one or perhaps better two, leap-frogging each other, could handle a whole brigade, and a system might be evolved whereby the brigade instead of the battery became the fire unit, at any rate in major operations. (Further reference will be made to this when dealing with the question of organization.)

It is an additional factor in favour of that commander, already specified, who may wish to hold some of his artillery in reserve; since guns which, without moving, were able to fire into other sectors than their own, could be called upon to do so whenever they were required and could be spared, without interfering in any way with existing arrangements. That very strict rules as to priority in answering calls from others than their own observers would be necessary, goes without saying, but careful organization should reduce the possibility of a disaster to a minimum.

Now since it is easier for a man to direct the fire of guns of a nature to which he is accustomed, and since the enlarged area, already referred to, available for battery positions may render the retention of howitzers, pure and simple, unnecessary, there is an argument here which, added to the well-known advantages of ease of production and ammunition supply, and to the possibilities offered by recent developments in design, of the hybrid weapon popularly spoken of as a "gun-how", might turn the scale in the direction of an homogeneous divisional artillery, armed with only one type of weapon. By itself R/T hardly provides a sufficient reason for such a departure from present policy, rather does it so

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increase the utility and efficiency of the weapons we possess to-day, as to give excuse for our continuing to possess them for many years to come.

II. Alterations to Equipment Suggested by the Foregoing Considerations.

Firstly, as regards signalling equipment. And in this connection let us ask ourselves the question :—Is it possible, and if so is it desirable to rely upon a single method of communication?

(a) *Is it possible?*

With regard to the purely technical progress and development of "wireless" generally, only an expert is entitled to give an opinion. But if we refer to articles which appeared in the Journal of the Royal Artillery in January and April, 1929,[1] we may hazard the following suggestions :—

(1) It *is* possible to design transmitting and receiving sets having the necessary range and reliability for the purpose in hand, and possessing the required degree of portability.

(2) There should be no difficulty in training men to maintain their sets in an efficient condition. For in these days "wireless" is the hobby of the million, and thousands possessing no technical knowledge whatever, are able to keep a valve receiving set in order.

(3) It should usually be possible to operate a sufficient number of sets in any given area, without mutual interference, though there may be occasions when their use will have to be restricted, and there is also the question of outside interference, whether deliberately the work of the enemy, or accidental, due to commercial signals or to atmospherics. Major Holden has pointed out the enormous number of wavelengths, separated by ten kilocycles, that are available on the short waves, and the comparatively few (14) required by a divisional artillery, so, since enemy jamming, if too blatant, might conceivably also interfere with his own signals, a system of alternate wavelengths might often meet the case. One cannot imagine that commercial signals will cause much trouble though there may be neutrals, even in the next war, who cannot be con-

[1] "Does Radio-Telephony offer a possible solution to the main Artillery problem of the day?" by Lt.-Col. A. F. Brooke, D.S.O., *psc.*, R.A., and Capt. W. C. Holden, D.S.O., M.C., R.A.

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trolled. Lastly, atmospheric interference and what I believe is known as man-made static, which precludes the use of short wave sets near running electrical appliances. The former is quite uncontrollable but only happens occasionally, the latter can be controlled. Taken all together, however, they do, at any rate to-day, provide sufficient chance of a breakdown in communications, which, at a critical moment might have such serious consequences that it would be quite unsound to rely entirely on R/T in its present state of development. It seems clear, however, that it is already efficient enough to form the primary means of communication, provided that it is backed by some secondary means to be installed as time and opportunity offer.

(b) *Is it desirable?*.

There must be many occasions, e.g., with the O.P. comparatively close to the battery, when the risk of breakdown or of cutting the wire is negligible, and it would actually be quicker to run out a telephone line than to instal a wireless set with its attendant aerial. There is no question as to which is the simpler and more efficient channel for passing orders. There is also a case for a telephone between main O.P. and battery when a F.O.O. is out using wireless, for while a G.P.O. cannot accept two sets of orders at once, his receiver will certainly endeavour to do so if both are coming in on the same wavelength.

One may naturally suppose that development work now being carried out on wireless sets for the Army, has for its ultimate goal, the substitution of these sets for line instruments, but while we have already indicated some possible uses for a telephone in a battery, it is hard to think of a situation in which "visual" can do anything that R/T cannot, or at any rate R/T assisted by telephone. "Visual" is not an efficient substitute in the event of a breakdown, in any but the most open type of country, and it is very hard to use it at all without exposure. Therefore, if it be found necessary to give up any of our existing equipment, visual ought to be the one to go, except perhaps in countries like India where its great range might render the retention of the helio advisable, and a pair of these instruments might be substituted for a pair of telephones.

To sum up these preliminary considerations we may say that wireless communication by R/T is already well enough developed

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to form the main link between O.P. and battery, but not to be the only one. And although it may eventually replace line telephony for all other purposes in front of Corps, yet for this particular purpose it would be better to retain the telephone and to abandon visual, at any rate for home service.

And so we come to the following conclusions :—

(A) That all visual signalling apparatus should be withdrawn from batteries.

(B) That batteries should be equipped with R/T transmitting and receiving sets, capable of remote control up to about 400 yards, and if possible of standard pattern for all natures of battery; and also with ordinary line telephone instruments and wire.

It is not quite clear whether the question of the number of instruments and the method of carrying them, comes within the terms of reference of this paper, but it is impossible to pass on without saying something on those subjects, in so far as they affect the organization of battery staffs and signal groups.

As regards the wireless sets, it is suggested that four is a suitable number, one for the F.O.P., one for the battery O.P., one for battery position and one spare, possibly for use in communicating with flank units, or possibly adaptable, with a change of coil, for the receipt of messages from the air. Also, four sets would allow a section to work independently provided that the wave-length situation permitted this. Another reason for suggesting the provision of a fourth set will be referred to later, when dealing with the question of organization. It might be possible to fit these instruments with telephone "pick-ups" so that they could be connected up and used with wire when congestion in the ether dictated such a course, and in this case they would probably work loud-speakers and give out orders direct to the guns. As regards telephones, four instruments might be suggested here also for use as has already been indicated and for communication between battery and wagon line, but we should prefer to have six, again allowing for spares, and to provide for those occasions, rare though they might be, when for one reason or another the use of wireless might have to be prohibited.

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As to the method of carriage. The telephones present no difficulty, since they would go with the men who use them, as they always have. But as regards the wireless sets; trials recently carried out by the 11th Field Brigade, R.A., with experimental battery staff wagons, if they have not enabled a decision to be taken as to the best type of vehicle itself, have at least established that the principle of having separate ones for the B.C. and G.P.O. is correct, and we can probably count on having them, both in horse-drawn and mechanized batteries in future. These vehicles carry between them two R/T and one W/T sets, the last being for use in communicating with the R.A.F. If this set is retained, well and good, but if one of the battery sets be used for this purpose, as suggested earlier, it would be unwise to accept the limitations imposed by carrying two sets in one vehicle; and since such sets cannot be carried on horseback there can be no doubt that each should have a vehicle of its own. For the present it is suggested that one set be carried in each of the B.C's and G.P.O's wagons and that in addition there be two light one or two-horse carts, each taking a R/T set and a pair of signallers. This of course for horse-drawn batteries. For mechanized batteries the question of having a few large or several small battery staff vehicles is still far from being settled, but the carriage and handling of these R/T sets must be given careful consideration in arriving at a decision, and would seem to be an argument in favour of the second alternative. In the end we shall probably come to adopt the principle of having a separate conveyance, independent of the rest of the staff, to carry each pair of signallers with their equipment and nothing else. Signallers, in the past, have always been able to move independently; the arrangement has worked well and there seems to be no reason to change it.

Secondly, let us consider the changes likely to take place in other artillery equipment. In this connection it should be noted that the introduction of R/T may not be so much the direct cause of the alteration suggested, as the deciding factor where such a change is already indicated for other reasons. No alteration is proposed for anti-tank and close support weapons, whether for infantry or for armoured fighting vehicles, and these should be retained, or rather, since there are none adopted at present,

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research should be continued with a view to the production of the best.

As regards divisional artillery weapons, a case has been made out for longer range, without which the advantages of R/T cannot be fully exploited; and without entering upon a discussion as to the rival merits of one big shell against two smaller ones, we can accept the fact that the bigger the gun the longer the range, and recommend that divisional artillery should be armed throughout with a 25 to 30 pr., 3½ to 4 inches calibre, fitted with a platform and having a weight in action of about two tons. This weapon to have three charges, "super", "normal" and "reduced", and a maximum range of not less than 15,000 yards. Should it be urged that such a weapon would be helpless in the presence of hostile tanks, we would suggest that each battery should be provided with two heavy anti-tank machine guns instead of their ·303 Lewis guns, and should use them indiscriminately against tanks or low-flying aircraft as occasion demanded. To medium artillery similar arguments apply, and we may visualize them armed with a single type of weapon capable of projecting a 70 or 80 lb. missile at least 20,000 yards. Anti-aircraft artillery, which is only concerned with targets visible from the battery position, is obviously outside the problem. Heavy artillery also, which does most of its shooting with aerial observation, or at map locations, is hardly affected. Its targets would usually be in the rear enemy areas, and so seldom visible to an observer on the ground, that R/T would prove of very little assistance.

III. Summary of the Combined Effect, upon Employment, of the Introduction of R/T itself, and of the Resultant Alterations in Other Equipment.

We have discussed some possible changes in artillery employment in considerable detail above, but when we attempt to summarize our conclusions it is disappointing to find how few alterations are absolutely necessary. The principles laid down in F.S.R., Vol. II, and A.T., Vol. III, continue to meet all likely contingencies; their scope may be slightly extended and their execution will be rather easier than it has been, but that is all. Turning to A.T., Vol. I, however, we may find that the increased depth avail-

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able for battery positions will facilitate their selection, and that—and this far more interesting—the battery position may be chosen before the O.P. That this would be a very important advantage in advanced guard actions, exploitation of success and in quickly moving operations generally, is obvious. A battery might be brought into action at the nearest suitable spot on the first hint of its services being required, the B.C. making for the first convenient O.P., leaving a F.O.O. to find a better, and to establish communication by R/T as soon as he could. As a result, artillery support for infantry should be forthcoming very quickly, and the necessity for a pause while plans were made and a programme was arranged might often disappear, with a consequent speeding up of the whole action. One result of this might be, as has been shown in the article quoted above, that no artillery would have actually to accompany the advanced guard.

IV. Effect upon organization.

Nothing has been said so far that might warrant interference with the existing organization of a brigade, as such, and its subdivision into batteries and sections. It still remains the most satisfactory unit for tactical, administrative and training purposes, and it is difficult to see how any change can be for the better. The question of brigade and battery staffs does, however, call for some comment, and it will be as well to examine the extent to which they may be affected.

Battery staffs.

The organization of the battery signal groups has already been touched upon; the only change would be in the method of locomotion, and it is suggested that until we can see our way to providing each pair of signallers with their own means of transport, "A" group should be divided between the B.C's wagon and one special vehicle and "B" group between the G.P.O's wagon and the other, the N.C.O i/c Sigs. to have a horse to himself.

Brigade staffs.

A suggestion has been made in the article referred to on page 138 for the formation of a special organization within an artillery brigade, to be called the "Close support inter-communication unit", whose duty would be to form the link through which

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information should be collected as to the requirements of attacking troops, and translated into the required supporting fire. Such a body as this, though not perhaps strictly concerned with R/T communication between battery and O.P., cannot be left out of consideration, since it may be called upon to deal direct with any battery in the brigade. We have already seen that the use of R/T may result in economy in F.O.O's, and the above-quoted proposal shows us a method of practising that economy and of employing our available resources to the best advantage. It is unnecessary to go through the working of this detachment in any great detail, its functions are clearly described in the article referred to, but a diagram, with notes, showing a suggested distribution and lay-out of the battery wireless sets within a brigade, is attached as an appendix.

The logical outcome of such a proposal is the substitution of the brigade for the battery as a fire unit, in all but the smallest encounters, scattered though its component parts might be over a comparatively wide area of country. The "close support inter-communication unit" would then become a permanent body, part of the brigade staff, and a very considerable reduction might be made in battery officers and staffs. From being the artillery fire unit it is but a step to making the brigade the administrative unit also, a course which has so much to commend it on other grounds, that the temptation to recommend it without more ado is strong indeed. But—there are so many occasions, especially in the type of warfare to which our army may often find itself committed, when a battery may have to act alone, and even in bigger operations, when the four batteries of a brigade may have to engage four, or perhaps more than four targets at the same time, with visual observation, and indeed possess the fire power necessary for the purpose, that we feel that it would be wrong to sacrifice the elasticity given by the present organization, or to deprive a battery of any measure of its independence. But let us have the "close support inter-communication unit" to work as suggested, and since it is unfair to deprive a battery of its commander to take charge of such a unit, well though the battery may be able to get on without him, and delighted though the captain may be with the chance of distinguishing himself, and since an improvisation is

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never quite satisfactory, let its nucleus, consisting, say, of one major or captain, one N.C.O. and a pair of signallers, at all events be permanent and part of the brigade staff, with a call on one pair of signallers with R/T from each battery as occasion may demand. This would mean the addition of one major or captain to the strength of a brigade, and might not commend itself from the financial point of view, but we are discussing ideals and future wars, rather than how to circumvent our present lack of funds.

Higher formations.

Higher formations would be affected only by the withdrawal of light artillery from the division, and perhaps in a change in the direction of standardization of weapons and homogeneity within brigades. Tabulated, and starting from the rear, the artillery with an army might comprise:—

Army artillery.—Heavy, super-heavy and A.A. batteries; also reinforcing batteries for corps and divisional artillery.

Corps artillery.—Medium "gun-hows" 70 or 80 prs. with a range of 20,000 yards.

Divisional artillery.—Field "gun-hows" 25 or 30 prs., maximum range 15,000 yards.

Light artillery.—Anti-tank and close support weapons, probably about one battery of each per infantry brigade. As to the exact nature of these weapons, or as to whether they should be handled by gunners or by the infantry themselves, it is not relevant to this paper to discuss, but they should not form part of the divisional artillery.

V. Conclusion.

It will have become clear by now that the introduction of R/T as a means of communication between O.P. and battery can, by itself, make very little difference to any of the three aspects in which we may regard artillery, viz.: Equipment, organization or employment; but that considered in relation to the trend of opinion on other grounds, it may make just enough difference to decide the path into which progress shall be directed. By itself it is not, and is not likely to be sufficiently reliable and jam-proof to form the only connecting link between battery and O.P., but it can do all and more than can be accomplished by visual means,

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which it may very well replace. One may hesitate to abandon *any* available method of communication, and it may be thought that the actual scale of equipment suggested is inadequate, but there is a limit to what can conveniently be carried, and when all is said and done, "visual" is very easily improvised, and a great deal can be done with an electric torch and a good pair of field glasses.

As regards the alterations suggested for field artillery, the important point is that the use of R/T offers the chance of a great improvement in its efficiency in carrying out what one might call purely divisional artillery tasks, provided that it is equipped with suitable weapons; and this it can be if it is relieved of duties so alien to its nature as anti-tank and close support work. The argument applies less forcibly to medium artillery, but here is an opportunity for the simplification of production, training and ammunition supply, so why not take it?

The method adopted in writing this paper, was first of all to jot down everything that occurred as bearing upon the subject, and then to turn to the writings of others, in order to see what had been forgotten. It was discouraging to find that not only had no epoch-making discovery been made, but that every conceivable aspect of the problem had been adequately dealt with already. The only explanation is that there is nothing new to suggest, and this is particularly true as regards "employment", where the changes recommended are a matter of degree rather than of method. Which, after all, is only what one might expect.

Let us close upon a note of warning. There is rather a tendency in modern times to think that the provision of a complicated instrument can take the place of training and can solve all difficulties. Nothing, of course, is further from the truth. So let us not make that mistake with regard to R/T; let us develop it for all it is worth, for it has a great future before it, but let us not forget that badly, or even indifferently handled, it may prove to be a danger and a curse rather than the salvation and the blessing we expect.

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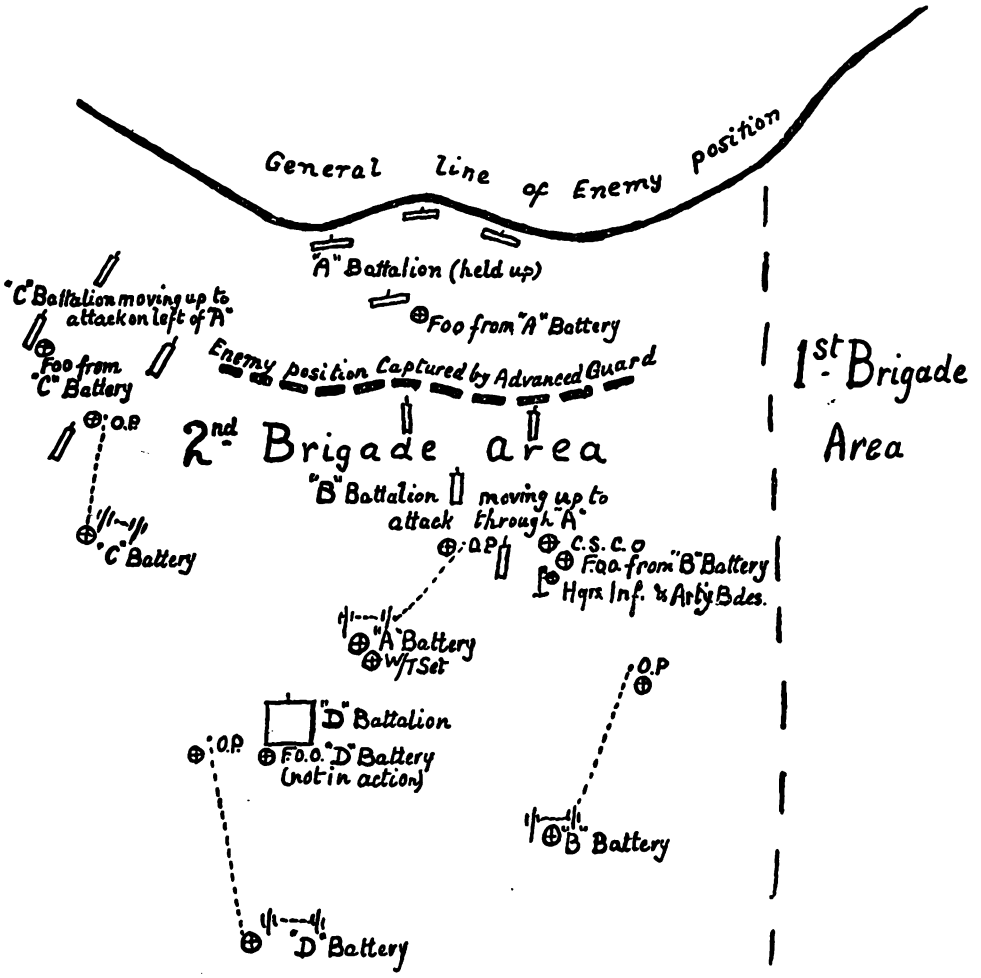
APPENDIX.

Diagram showing a suggested lay-out of battery R/T sets within a brigade, during an attack upon a semi-prepared position, by an infantry brigade, forming part of a division; after a successful action by the Advanced Guard.



NOTES.

1. R/T sets shown ⊕, 3 in use by each battery and one by "Close support communication officer" (C.S.C.O.).
2. Telephone lines shown ----------.
3. Brigade communications are not shown.

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4. All battalions are assumed to have their own anti-tank and close-support weapons.
5. "A" and "B" Batteries are primarily in support of "B" Battalion, "C" and "D" Batteries of "C" Battalion.
6. R/T sets at battery OP's are listening only.
7. "A" Battery has been detailed to answer air calls.
8. The "C.S.C.O." (Close support communication officer) is established in the position from which he observed the attack of the Advanced Guard ("A" Battalion). He has with him the F.O.O. from "B" Battery; and the F.O.O. from "A" Battery who advanced with "A" Battalion is now established in a F.O.P. F.O.O. "B" will advance with "B" Battalion and establish himself as soon as necessary, upon which the C.S.C.O. will advance to F.O.O. "A's" position, the latter closing down and preparing to advance through F.O.O. "B". F.O.O. "C", who might or might not be necessary, according to circumstances, nature of ground, etc., would advance with "C" Battalion. He might be withdrawn later, or work with F.O.O. "D", and "D" Battalion, according to the subsequent development of the fight.
9. Now, if we can count on an allotment of four wave-lengths for use within the brigade (14 being allotted to the Divisional Artillery), these four might be Nos. 1, 4, 7 and 11, so as to be as far apart as possible. It can be assumed that no R/T set can listen on more than one wave-length at a time, though it can transmit on any, so,

   The "C.S.C.O." should listen on wave-length No. 1;
   "A" and "B" Batteries and their O.P's, on No. 4;
   "C" and "D" Batteries and their O.P's, on No. 7;

   leaving No. 11 spare, in case of the necessity of detaching a battery, or for any other purpose.

   F.O.O's and the "C.S.C.O." would transmit on the wave-length appropriate to the receiver they wished to communicate with. In the event of any of them wishing to broadcast a message, a warning call could be given on all wave-lengths in use and the message sent through on a pre-arranged common one.

   Flanking brigades should have similar arrangements, and should it be necessary to call for fire from either or both of them, it might be done best through their "C.S.C.O's", using the appropriate wave-lengths, and leaving them to broadcast the information to their own batteries.

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THE DEVELOPMENT OF ARTILLERY SURVEY.

A Lecture delivered at the Royal Artillery Institution, Tuesday, 18th February, 1930.

BY BT. LIEUT.-COLONEL A. F. V. JARRETT, M.C., R.A.

Major-General H. R. Peck, C.B., C.M.G., D.S.O., in the Chair.

CHAIRMAN: Gentlemen, I have much pleasure in introducing Colonel Jarrett, who has come to lecture to us on the progress of Artillery Survey, and I will ask him to start straight away with his lecture.

LIEUT.-COLONEL JARRETT: The only excuse for Artillery Survey is that it shall help the gun to hit the target. This is one of those things which would not appear to need saying; but it has not always been kept in mind either by the surveyor or by those who deplore his existence. Critics have been known to say that the artillery surveyor is too often carried away by his art and forgets its purpose; they may at times be justified, but perhaps they would not say this if they had his knowledge of the myriad ways in which survey can go wrong. If, on the other hand, the surveyor has been occasionally accused of adopting the attitude of Robinson Crusoe—

"I am monarch of all I survey,
My right there is none to dispute"—

this has largely been due to the vagueness of the orders which he has received on those occasions; those who were using him were not quite sure what they wanted him to do, and they ought not to have been surprised if he did not do it. Artillery survey is developing in two ways; we are all now beginning to understand what we want from the surveyor; and he is therefore able to apply his technical knowledge to some definite purpose.

The surveyor claims that gunnery is only a branch of survey, the gunner claims with equal truth that survey is the handmaid of the gun; the two things cannot in fact be separated. To survey means to fix and record the relative direction and distance of two points in three dimensions; and this is what gunners have been

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trying to do ever since they were armed with catapults and known as Engineers. We have got past those two stages now; nevertheless our most satisfactory method of obtaining the necessary data for accurate fire is still what it was in those days; we get direction over the open sights and distance by trial and error. Modern conditions have forced us into other ways which we call Gunnery, but which are also used by all surveyors; we have in fact always surveyed, as the Frenchman talked prose, without knowing it or possibly much about it. We have recorded a direction and distance as Target A; T.O.B. is only a traverse closed by a shell; the surveyor calls our angle of sight a vertical angle, or even sometimes a zenith distance; but these are differences in language only, not in essentials. If we study the principles of survey as given in the Manual of Artillery Survey, we will find that we have to apply them whenever we range a battery. All these things we did or used before the battery surveyor was invented, and without calling upon a survey company, a grid, or any other relic of frightfulness. Why should we need them now?

When Napoleon massed his guns he did so because with their short range and primitive sights there was no other way of massing his shells. When the German guns in 1870, in spite of their greatly increased range, fired almost wheel to wheel, it was still in pursuit of the principle of concentration. Improvements in other peoples' lethal weapons gradually showed that these methods were no longer possible; the eggs had to be taken from their basket and scattered over the countryside. The battery became the largest unit whose fire could be controlled by one man. It was as desirable as ever to mass the shell at the decisive point, but obviously it was much more difficult; it could only be done by pointing out the target to each battery commander and letting him range on it; under certain conditions one battery commander might be able to range batteries other than his own—in any case it would have to be a slow business, costly in ammunition, and completely negative in the element of surprise. If we say that this is to remain the only way in which it can be done we are admitting that there has been no advance in the control of artillery fire since artillery was invented; to produce some better method than this is the object of the artillery surveyor and the reason for the grid.

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To realize what has to be done we may consider first the battery. At every O.P. the zone for which the battery is responsible has to be registered as soon as possible, either by shooting or instrumentally; by this we mean that from the gun or the O.P. the direction and distance of various points in the enemy lines are measured and recorded with such accuracy as is possible; and although this has always been done without thought of survey, and by men who are not tradesmen in any financial sense, it obviously is, or may be, survey information of the most valuable kind. By convention we call these enemy points "targets" and in their selection many other people than the surveyor are interested; but we can, I think, accept that it is always possible to fix, more or less accurately in relation to the O.P. the direction and distance of any definite point which can be seen from it; and to fix this point also in relation to the gun provided either that we are allowed to shoot, or that we can fix the relative positions of O.P. and gun. Considering now the Brigade; if the information so obtained by any one battery can be made of immediate use to the remaining batteries, it is clear that we have greatly simplified the control of the fire of the brigade and introduced the possibility of surprise. To convey this information rapidly and clearly we need some sort of a code by which we can so explain things to other batteries that they will know, or can quickly arrive at, their line, range and angle of sight to the various targets which the first battery has registered, even though they cannot see them. Such a code is to be found in the system of rectangular co-ordinates, which we call, for brevity, a grid. When one is surveying it is not necessary to use a grid, it is merely convenient; but it is very difficult without one to explain to anyone else what one has done. Coming now to artillery formations larger than the brigade, it is clear that as long as all are using the same code or grid, the information obtained by any one battery is of use to all; control of fire is more widely extended, and the possibility of both surprise and concentration considerably increased.

Briefly, then, batteries register silently or by shooting; the surveyor puts as many guns as he can on to the same grid, in order that all may make use of each other's registrations. To provide this universal code the surveyor has to establish what he calls a

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"control"; this is a rigid framework of fixed points into which all the battery registrations can be fitted, as the glass is fitted to the leading of a stained glass window. It is established by the professional surveyor, sapper or gunner, each in his degree; and it must be based in each case on the best survey information available at the moment, improving later when time and opportunity allow.

To illustrate what is meant by a "control", we may imagine that from each pivot gun of a brigade or division the direction and distance to various targets have been found, and recorded on a transparent "range taker's card"; suppose also that on a drawing board we have recorded the relative position of each gun and either that of one of its targets (called the control point), or else of the line from the gun to a target (a zero line); we have, then, on the drawing board a control on to which it should be easy to pin the range takers' cards so that they shall be in their correct relative positions. If over or under the whole we have a grid, we can read off and broadcast the co-ordinates (the heights we must calculate) of these targets to any guns which we desire to shoot at them. By, so to speak, decoding the message those guns can calculate the line, range and angle of sight which should suffice to hit them. If they do so suffice we have arrived at the "better method" at which we are aiming. The "range taker's card" need not be taken literally. It is quite possible to calculate the whole thing without any drawing at all.

But all this takes time. The difficulties of survey increase rapidly with the size of the area to be surveyed, and decrease with the time available; the latter we can never know, since we cannot foretell what the enemy or the weather will do to us. If, therefore, we want results quickly, we must confine our survey to a small area; we can seldom in any military project have everything we want, and if for instance there is no time to stage an attack by a corps we have to be satisfied, if we must attack, with the independent efforts of divisions or even brigades. The total area to be surveyed is the theatre of war; the provision of the control for the whole of it, down to and including a corps area, is the province of the R.E. surveyor; it calls for a specialist for whom survey must be a profession and not a category, and who has plenty of time in which to do it. The small surveys from O.P. and gun

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to target are made by battery personnel who are surveyors, if at all, without knowing it; between these and the R.E. control are, or may be, other controls (brigade, division, corps), fitting into each other like a nest of Chinese boxes, each increasing in size and therefore in difficulty; these are the province of the battery surveyor and the surveyors of the R.A. Survey Companies.

As to the sequence in which this work is to be done; it is one of the principles of survey that we should work from the whole to the part; and if we follow this principle literally we will arrange for the R.E. control to be fixed first, and information concerning it circulated to all concerned; the lesser R.A. controls as far as gun and O.P. will each be fixed in the same manner, each waiting for the necessary information from the control in which it is to fit; finally the registrations fall accurately into place. These last, of course, are done in any case without waiting for anyone, whether there is to be survey or not. Meanwhile, perhaps, the enemy may wait for the avalanche to fall, but it seems unwise to gamble on it. It is not, however, necessary to follow a principle, whether survey or any other, to the death. The poet tells us that a merciful providence fashioned us hollow in order that we might our principles swallow; and if we keep in mind that time is probably short, that the smaller the area the quicker the survey of it, and that in any area the fewer the points to be fixed the shorter the time required to fix them, it will be clear that there is at least something to be said for the system advocated in the annual memorandum of training for last year and this. That system is briefly for each control to be started on such information as is to hand, without waiting for anyone else; the whole being fitted together as it is wanted. We are not, as a matter of fact, doing anything against the aforesaid principle as long as we apply it to each of the component surveys, controls, arbitrary grids or whatever we like to call them; make each as accurate as we can as far as it goes; and realize that no two of them can fall into place unless and until the superior control has been established. This of course is Mass Production; and although, perhaps, a Rolls Royce cannot be produced in this way, we need not despise the Tin Lizzie which is finally evolved, as long as she gets us where we want to go in time for us to be of use; we do not need her for long. Should the battle remain

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stationary for a day or two, the more accurate machine can be built up from the rear, complete with large scale maps, and we can discard the hasty patchwork which will have served its turn.

We may now recapitulate the responsibilities of those concerned.

The battery registers its zone and records the information so obtained.

The brigade has to get all its guns, O.P's, and targets on to the same grid; if possible on to the army grid which has been initiated by the R.E. To get the guns on to the same grid a bearing picket is established on the best survey data available; at a pinch the map and compass will provide the data, which, although inaccurate, will be equally inaccurate for the whole brigade and therefore accurate enough. Once this is done, co-ordinates found by shooting one gun should be reasonably accurate for the remainder. In order to make the "silent registrations" equally useful, it will be necessary to fix the O.P's and some control points on the same grid as the guns, or at least the O.P's and some sort of a zero line on which the supposititious range takers' cards can be properly placed and oriented. An observation post may be anywhere from a front line trench to a far-off hill top; there can be no "drill" for fixing it. There must, in any case, be some means of getting at its height; otherwise when a target has been fixed by shooting it will be impossible to disentangle map range from the range at which the gun was fired. There is a possible use here for the brigade barometer; also where convenient "spot heights" exist, a map, especially a small scale map, is often more accurate vertically than sideways. When all this has been done the brigade commander can thoroughly control the fire of his brigade. Also, incidentally, once the gun and the O.P. have been accurately fixed, the shooting of a battery is considerably simplified, and the surveyor who has done as much as this has not laboured in vain.

The R.A. survey company has to get all the brigades on to the same grid; again, if possible, this will be the army grid from the beginning. Where time is short and R.E. trig. points few they may have to content themselves with getting each division on to a grid; and this will often happen when divisions, after advancing independently, have first made contact with the enemy.

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In the memorandum of training for 1928 there are suggested seven ways by which they can provide the control for the brigades; circumstances will determine which method they will use, and, of those circumstances, time will generally be found to be the determining factor. The object of the survey company must be to make as large a fire unit as possible in the shortest possible time; the ideal being that the control of the fire of all the artillery should be placed in the hands of its commander.

The technical details of all this are given in the Memorandum of Training of the R.A. already referred to; there are, however, a few points which, since they are of the very backbone of survey, may be enlarged on here. The importance of bearings in artillery survey can hardly be over emphasized. If bearings are correct, small errors in co-ordinates will be swallowed up by the zones of the guns, the burst of the shell, and if necessary by a little searching and sweeping. We lay our guns on a calculated bearing with the aid of a bearing picket; when we have done this, even if the gun co-ordinates from which we made our calculations are wrong, our shells will travel along a line which is parallel to the correct line, and we will only miss the target by the amount of the error in our gun co-ordinates. Whoever surveyed the gun will know the size of the probable error to which he is liable, and this can therefore, be anticipated and allowed for. If our bearings are wrong, even though our co-ordinates are accurate, we will miss the target by an amount which will vary with the error and the range, and for which we can make no reasonable allowance. Again, if at the O.P. we can measure bearings to targets with accuracy, we can afford some error in fixing the co-ordinates of the O.P. We cannot hope for accurate fixation of targets if our data are not accurate, but we will get reasonable triangles of error from which the reliability of our results can be to some extent gauged. If the bearings are wrongly measured we can only expect chaos. Further, if a survey has been made on an arbitrary grid of which the orientation is correct within a few minutes, the change to the R.E. grid when the R.E. co-ordinates of one point are known is a simple sum in arithmetic; if the orientation is wrong the difficulties increase literally a hundredfold. In short, in all our work, if bearings are correct we can afford (though we try to avoid) a certain inaccuracy in co-ordinates;

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and this is fortunate since it is obviously much easier to measure an angle than a distance.

Regarding the measurement of angles, the survey text books lay down certain precautions for carrying out an apparently simple operation which we have done for years by a twist of the director. No sane person will insist that these precautions are always to be observed whenever an angle is measured, but it is a fact beyond dispute that if they are not observed there will often be large mistakes even when an expert is doing it. In survey everything depends upon accurate angular measurement, and if we omit these precautions we must know what we are doing and be prepared, if we rely on our measurements, for a possible fiasco.

The methods of measuring distance are given in the text books; there is however one way which is not perhaps sufficiently emphasized therein, and that is the rangefinder. The present instruments are not ideal for survey—they were not designed for that purpose, and they aim at reasonable accuracy at ranges at which they cannot be accurate as a surveyor understands that word. The artillery instrument is unwieldy and will not read ranges under 500 yards; the infantry pattern cannot be read with real accuracy at 1000 yards; nevertheless within limits both are invaluable to any surveyor who can lay hands on one. What he would like is a portable instrument reading from about 100 yards to 1000 or so; with this he can traverse, or measure a base for triangulation, and fix points accurately at ranges where the rangefinder itself can only give an approximation. If someone will invent such a weapon, and also a compass which is not affected by casual lumps of metal, he will have made the survey of a brigade area a very simple business.

As things now are a good deal is expected from the surveyors in the brigade—the "Battery Surveyors". They have to do most things that any military surveyor has to do, and to do them very quickly; they have, it is true, more simple instruments to handle and a much smaller area to deal with. To do what they have to do they must without doubt be formed into a team, which is generally known as the Brigade Survey party, under the control of an officer with something approaching professional qualifications and experience. They need also their own outfit of stores and transport; but all this question is in the air just now, and the ice is rather thin.

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The organization of a Survey Company, R.A., is also at present under consideration. I can only give the organization which I advocate. The O.C. has a small administrative H.Q.; the remainder of the company is divided into three groups, flash spotting, sound ranging and survey. The first two are corps units, working to the instructions of the C.B.O., and the details of their interior organization need not be gone into here. They carry out for themselves such survey as they require, and are not normally concerned with the survey of the guns.

It will be easiest to consider the organization of the survey group from the wrong end. The subsection consists of an officer, an N.C.O. and six surveyors; this may seem a very small command for an officer, but it should be remembered that it may cover a very large area of country. By the time that the officer and his assistant have reconnoitred three points some miles apart, have placed a pair of surveyors at each, have pointed out what objects are to be surveyed, made sure that this has been done, collected and checked the results and gathered the party together again, they will have earned what pay they get. They may, on top of this, have to do the necessary computation. This party is strong enough to observe one or two triangles, compute a triangulation, carry out a traverse or resect three points simultaneously; it is as much as one man can handle.

The ideal section consists of three such subsections, two to observe, and one to compute; two sections forming the group, which is the corps unit. In addition the group commander would like to have, under his hand, a spare subsection to carry out any odd jobs which may, and probably will, eventuate. A group, organized in this way, is a flexible command, neither a mass of surveyors from which a scratch team may be hastily picked and sent out on any task which has to be done, nor a series of watertight divisional compartments. The working unit is the subsection, which may if necessary be detached from its section to reinforce another or to work on its own.

The word "divisional" has purposely not been used because it is important to keep this idea of flexibility thoroughly alive; although one may in fact expect that normally a section will work for the artillery of a division. Nothing has been definitely laid

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down, but it would seem reasonable that a survey unit should be prepared as any other artillery unit to work under the command of or in support of those it serves. To give two examples: Suppose a corps advancing with two divisions on parallel roads some miles apart; here undoubtedly a section, or at any rate one or more subsections, would be placed under the command of the C.R.A. of each division, since any engagement at short notice would necessarily be a divisional affair; to organize a corps attack would require at least 24 hours, and this will give time for the sections to be withdrawn into corps control. Again, suppose a corps withdrawing to take up a defensive position; there would seem to be no reason to break up the group; the corps area would be surveyed as a whole under the group commander, who would probably distribute his sections geographically, to suit the accidents of ground, without considering what particular troops were to occupy any particular portion of it.

So much for what is to be done and who is to do it. It is done by many people, and there is still the question how all these people who are working to a common end, trying to help others and to get help for themselves—how they are to obtain touch with each other, find out where everyone is, what they are doing or have done or would like done for them; in a word—"liaison"; and it is no doubt obvious that the methods advocated, or any others which aim at speed, call for adequate and reliable liaison between the parties concerned, who will need clear and definite instructions on this point; these instructions must differ with circumstances, and with the way the various survey units are disposed. Many other people than the surveyor are involved and it is not for him to lay down the law; here however are some suggestions.

Within the brigade each battery sends a copy of its registrations to brigade H.Q., where they are combined by the Brigade Survey Officer, and supplemented where necessary by his own observations. A brigade fighting map is thus produced. The brigade, having made arangements for their own interior survey, tell the R.A. Survey Company where they are to be found and what they are doing.

The R.A. survey company may be working as a whole, under corps control; but in any case they will have detachments working in support of or under command of divisions. As soon as they

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learn, through C.R.A's concerned, the general areas which brigades will occupy or have occupied, they will tell those brigades, via their C.R.A's, where they can get into touch with some portion of the survey company detailed to assist them. Gunner liaison is now complete.

The official link between R.E. and R.A. is the officer of the survey directorate (R.E.) on corps H.Q. Apart from this there will undoubtedly be a good deal of direct liaison between the R.E. and R.A. survey companies. To get at the right answer under peace-time conditions is not easy; a good deal of strain is of necessity thrown on the imagination. Experiments have to be mostly made in this country, which is thoroughly surveyed from end to end; and which, in spite of that, has greater survey difficulties of terrain than any possible theatre of war on a large scale. Our climate is well known, we have few mountains, our hedges are high and frequent; the latter in war time can be short-circuited with an axe, but not in peace; the fog of war and the effect of crowded roads on the movement of surveyors can be to some extent allowed for; but the greatest difficulty of all is in realizing what possibilities there are of liaison with R.E. survey units who do not exist as such in peace, but on whom we are dependent in war for the grid on which we must eventually work. Where they and we start from scratch we will of course get the necessary information from them; but how long we will have to wait for it, or under what conditions they can, by reason of their previous survey knowledge of the theatre of war, start so far behind scratch that we will not have to wait at all, we have no means at present of knowing.

Large scale maps have been mentioned; owing to improved methods of dealing with aeroplane photographs, the prospects of getting large scale maps under certain conditions of mobile warfare are much more rosy than they have been. One hears it said that the introduction of these maps sounds the death knell of the artillery surveyor; there is on the other hand no artilleryman who will give them a more cordial welcome; and he is no more anxious than the next man to join the unemployed. It is a sound general rule that co-ordinates can be obtained from a map with an accuracy in yards suggested by the thousands in the denominator of the R.F. of that map; e.g. 20 yards with a 1/20,000 map. This is accurate

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enough for the co-ordinates of a point at which one wants to shoot; for target fixing we need no more, and the artillery surveyor is relieved of his hardest task. As regards the guns, there will be many occasions, especially in enclosed country, where it will be possible to fix their position from such a map to this accuracy of 20 yards or even better; and this will probably suffice for mobile conditions. There are however occasions where accuracy to this figure cannot be expected, as in a bare valley where the map shows only contours; nevertheless even then something can be done. When we come to getting bearings from a map, we realize its limitations. Our gun co-ordinates may be wrong by 20 yards; if we can see an aiming point which we can identify on the map, we can obtain its co-ordinates with similar accuracy. If the aiming point is two miles away (and how often can we expect that in enclosed country?) we find from the "gunners rule" that we are liable to an error in bearing of 40 minutes; if I have made myself clear as to the necessity for accurate bearings, it will be realized that an error approaching this is very much more than we can afford to risk. We still require the bearing picket to give us bearings, though we need not perhaps insist on knowing its co-ordinates if those we get from the map are good enough for our purpose; or rather for the purpose of the infantry (not necessarily pedestrian) for whose sake we exist. And we must have the surveyor to put the bearing picket there. If anyone invents the ideal compass previously mentioned, it is possible that with its assistance the large scale map will do all that we want when the situation is fluid and things are moving. Even so, the most optimistic sapper will not pretend to guarantee the large scale map under all conditions; and when the battle stabilizes for a while and we must have accurate unobserved fire, we cannot afford any avoidable inaccuracy; we need the best co-ordinates we can get for our bearing picket and an accuracy of bearing within the figure to which we can set our sights.

This brings us to the ideal, "accurate unobserved fire", the obtaining of which requires the united efforts of the whole team, in which the surveyor is only a unit. Where the conditions are suitable he can produce accurate bearing, map range and angle of sight; he can do no more. When calibration, meteor and communi-

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cation problems are solved with equal success, we will have arrived at those "certain conditions" under which artillery can "engage targets by day or night without observation and yet with accuracy"

(A discussion followed.)

CHAIRMAN: Then if no one has any further question to ask, I am sure, gentlemen, that you will pass a hearty vote of thanks to Colonel Jarrett for his very interesting lecture, signifying it in the usual way. (Applause.)

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SECTION COMMAND.

By Major-General Sir John Headlam, K.B.E., C.B., D.S.O.,

Colonel Commandant, R.A.

THE thoughtful paper on "The New Artillery" in the April Journal will have been read with pleasure and profit by those retired officers—more numerous, I think, than Brigadier Finlayson imagines—"who cannot break themselves of the habit of reading the R.A. Journal". And they will, I am sure, have appreciated the generous tribute he pays to the "Old Artillery", and to the efforts of those who strove during the early years of the century to graft upon our traditional tactics the strange methods learnt in South Africa, and to make our gunnery worthy of the unexpected powers of our new Q.F. guns.

Brigadier Finlayson's careful investigation of the duties of officers of all ranks will no doubt be rewarded by ample discussion. His courage in suggesting that full use is not made of the subalterns under our time-honoured section organization has emboldened me to offer the following account of an alternative system. We have all been brought up to believe that section command is the very foundation of our battery efficiency, the admiration and the envy of the other arms. My temerity in considering the possibility of other methods should, therefore, at least provoke a reply!

In America there was introduced during the War a fundamentally different organization, in which the work of the battery is divided into "Departments", and each subaltern is charged with the control of one of these, instead of with the command of a section. Put shortly the distribution of duties is as follows:—

Department "A" is the Guns, and the officer in charge—usually known as "The Executive"—is responsible for the training of the gunners and the care of the *matériel.* In action he is the Gun Position Officer.

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Department "B" is the Horses, and "Lieutenant B" is responsible for everything connected with them, and their saddlery and harness; as also for training the men in equitation. In action he is in charge of the Wagon Line.

Department "C" is the Battery Staff, and "Lieutenant C" is responsible for reconnaissance and communications. He trains the signallers, look-out men, patrols, etc., and in action acts as Battery Commander's Assistant or as Forward Observing Officer.

Department "D" is the Men, and "Lieutenant D" is responsible for their housing, clothing, and feeding, and for interior economy generally. In action he acts as assistant to "the Executive", especially as regards the supply of ammunition.

I have discussed this organization with officers of all ranks in the United States Field Artillery, many of whom had, of course, been brought up under their old system, which was the same as ours. But with few exceptions, and those naturally among the more senior, they were in favour of the "Departmental" organization; and my latest information is that it has been found to work so well that there is no prospect of a return to section command. The first and most obvious criticism is that it must lead to specialization, but my American friends are positive that in practice, with due precautions, it does not do so. On the other hand, they hold that it gets the work better done, and that it corresponds with the modern distribution of duties in action, and is therefore logically sound.

In conclusion, lest the suggestion that such heretical ideas should even be discussed, be ascribed to bolchevistic tendencies on my part, may I explain that my regimental life was passed in the strictest orthodoxy? From the day I joined the service, and took over the Centre Section of the 32nd Field Battery—B/3 as it then was—to the day I handed over the Right Section of the Chestnut Troop on promotion, my section was the joy and pride of my life. But the essence of the section organization is that the section commander should be "the commander of his men in the fight, their trainer for the fight, and the keeper of their welfare at all times".[1] He was all this at Mons, as he had been at Waterloo, but during the

[1] "The Section Commander" by Major-General (now Lieut.-General Sir Herbert) Uniacke.—*Proceedings R.A.I.*, Vol. XLV, page 285.

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later stages of the War what opportunity did a section commander have for seeing to the welfare of his drivers and horses—how often did he even command his own guns in action? In all professions, and certainly not least in ours, usages have a habit of lingering on unquestioned long after their *raison d'être* has passed away. It is good therefore that we should be called upon occasionally to show reason for the faith that is in us. If the system of section command is still the best for the "New Artillery", as it certainly was for the "Old", it should be easy for its adherents to prove their case. If, on the other hand, it has outgrown its usefulness, it must go the way of so much else that we old soldiers mourn! For:—

"Time makes ancient good uncouth;
He must upward still and onward
Who would keep abreast of Truth."

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HINTS ON TRAINING THE INTELLIGENCE AND POWERS OF OBSERVATION OF OFFICERS, NON-COMMISSIONED OFFICERS AND MEN.

By Colonel L. W. Parsons, C.B., R.A.

(afterwards Lieut.-General Sir Lawrence Parsons, K.C.B., Colonel Commandant, Royal Artillery).

[The following article is republished by request of the M.G., R.A., in India, and many other artillery officers. The article was originally written, when after his return from the South African War, Colonel Parsons, as C.R.A., was running the Horse and Field Artillery Practice Camps on Salisbury Plain. The article was republished as a pamphlet and has been in constant demand ever since, the seventh impression having been made in 1917 in the thick of the Great War. With the exception of the paragraphing and method of printing no alteration has been made in the original article. Ed.]

I HAVE long thought that the training of the individual intelligence of officers, N.C.O's and men has either, as a rule, not been attempted at all, or has not been carried out on common-sense lines. By training the individual intelligence, I mean, so training officers and men as to evolve and develop to the fullest that share of common sense with which nature has endowed them. In plain language, teaching them to keep their "eyes and ears skinned and their wits about them." This war[1] has shown that from "Recruits Drill," the base of the pedestal of the Military Education Monument, to the spike of Armed Science's helmet at the top, many weak points have been left which the "Simple Farmers" of the Dutch Republics have often turned to their advantage. A tendency has arisen to father all our shortcomings on the unfortunate drill books, on which much thoughtless and undeserved criticism and abuse have been showered.

The books themselves are good books, and are at least the result of an amount of careful thinking out that no one who has

[1] South African Campaign.

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not had a share in the compilation of a drill book, can realize. It is not the books, but the misreading of them, and the widespread misunderstanding as to the use and scope of a drill book, that are to blame. A drill book, being necessarily of very portable size, can at best be but an elementary text book, giving the details of drill and procedure suitable to normal conditions on the drill ground, laying, as it were, the foundations of military training. "The application of drill, as affected by ground and other conditions is practised later, and under service conditions," this completes the edifice of that military training, and the success of the building must depend on the individual intelligence and capacity for imparting instruction possessed by battery and section commanders. That better results are not universally attained in the direction of training individual intelligence is in no way due to lack of zeal or industry on the part of Battery officers, but to the fact that they have got into a groove and don't know the way out of it: don't know in fact what, when, and how to teach intelligently. In the hope, therefore, that my own experience in training officers and men, I think I may claim, with some success, may be of use to Battery officers of all ranks, I with much diffidence accept the invitation of the Committee of the R.A.I. to put on paper a few hints that I trust many better qualified officers may supplement and amplify.

Recruits drill.

The inculcation of common sense and the training of his reasoning powers should commence from the very start of a recruit's training. This training, at all events in squad drill, is carried out by N.C.O's. I think that the recruit's first lesson includes "The position of the shoulder at attention." Now what is our usual experience of a N.C.O's method of teaching this? Is it not that, the average N.C.O., proud of his knowledge of book and powers of repeating many lines of it by heart, pours out the whole of the instructions given on pages 115 and 116, "Cavalry Drill, 1898," heedless of the fact that those detailed instructions are for the information of the instructor only? How many of an average squad of recruits is a bit the wiser as to the position of his toes having heard that they are to "make an angle of 45°"?

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Would it not be quicker and better for that N.C.O. to place himself in the correct position in front of his squad, tell them to place themselves likewise and then walk round and correct each man, meanwhile explaining the various points of the position and their reasons. The reason for turning out the toes at an angle of 45° is that that position gives a man the firmest base to stand on. This can be amusingly exemplified by placing the squad with their toes *together* and giving the flank man a shove.

Those of us who can carry their minds back to the days of M.L. guns and "sponging out" may remember the hopeless bewilderment of an unhappy recruit at his first gun drill on having the detailed instructions for picking up a sponge bawled at him. The same recruit that morning had probably picked up a mop, dipped it in a bucket and applied it to a table top, most correctly with "his left hand back down and his right hand back up," simply because no sane man with the proper complement of hands would think of doing it otherwise until bewildered by misapplied drill book. At sword and carbine drill is it not usual to hear similar long repetitions of pages of drill book by instructors while men are being kept in strained attitudes and time is being wasted?

The worst offenders are as a rule young N.C.O's fresh from rough riders or school of gunnery courses thirsting to show how well they know their books by heart. Again this has a familiar ring about it. "No. 4 tell off your position and duties in action"; and how often have we seen an excellent and nimble fingered but slow thinking and slower speaking gunner utterly taken aback and nonplussed by this order at an inspection? Would not "No. 4 place yourself and do your duties in action" produce better results and with less waste of time and agony of mind? These are just a very few out of the very many instances of want of common sense in drilling recruits which we may see on any battery parade ground. It is the duty of battery officers to teach their N.C.O's to instruct, and to teach others to teach they must learn to do so themselves first.

Young officers often shrink from drilling a squad because they feel that they cannot repeat pages of the drill book with the parrot-like fluency of the N.C.O. They should understand that the substance and not the wording of the book is what an instructor has to

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impart to the recruit. They should remember that the average recruit learns more quickly and more pleasantly to himself, through the eye than through the ear. The terms "angle of 45°," "vertical," "perpendicular," "horizontal," etc., are freely used in the early instruction of illiterate recruits! How often are their meanings made clear by visual explanation?

Trained soldiers.

The same absurdities are noticeable all through the soldier's training. What rough rider drilling a squad of trained N.C.O's at sword drill, having his squad "laid" for "Cut 2 to the right at cavalry" can resist running through the rigmarole "Now at two cut horizontally from front to rear at cavalry, etc." instead of simply giving the word of command "Two" and then putting those who are wrong right. Double the amount of useful instruction could be given in the time if the eye and not the ear were made the vehicle of instruction in manual details.

Sentries.

Does our method of training sentries in peace ensure security from surprise in war? I remember during the last Fenian scare in London stopping to admire the clockwork precision of the two sentries of the Foot Guards over the magazine in Hyde Park. They marched in the same direction along each wall of the magazine enclosure, turned inwards with a click at the ends, looked at each other, turned inwards about with another click, marched back again. Periodically, and at uniform intervals, they halted, both men at the same end and looking steadfastly in the same direction for some minutes. This nursemaid aweing performance left one or other end of the building quite unguarded frequently for some minutes at regular intervals, and I saw how easy it would be to throw a bomb and get safe away, but for one thing, and that was a guardian angel in blue in the form of a policeman, who unobtrusively watched over the safety of the sentries and their charge.

There is no reason why a sentry should not look smart and be useful as well. Why should walking about in a brisk and soldierlike manner be the chief object of his tour? Why should he not be trained to keep watch in a keen and soldierlike manner standing

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still, with only enough movement to keep himself warm and the whole of his charge in view? Why should he be trained to look only in one direction when halted? and teaching a recruit that the "front" of his post is one fixed direction has this effect. The drill book is not answerable for these common ideas about sentries.

An officer in my brigade division in Natal removed several breech blocks from the guns of his own battery one, not abnormally, dark night. The gun park sentry was doing what he had been taught to do to the best of his ability, walking smartly up and down in front of the points of the poles, while the officer in question was quietly sitting on the trails taking out the breech screws. This little incident may suggest more practical methods for visiting rounds, attracting sentries' attention than clanking a sword; and a better sentries' walk than that along the line of poles.

Effect of discipline.

Most, if not all, of our drill books and handbooks of guns contain excellent general rules for the instruction of recruits. These rules are more honoured by their breach than by their observance. Some people argue that the training of a soldier must be such as to stifle initiative, self reliance, will power and resource in a man, because a soldier must be trained to rigid discipline. Nothing could be more unsound or fallacious. Discipline means, practically, obedience of orders, observance of regulations and the submission of one's own will to that of superiors. A sailor is a disciplined man and yet no one can deny him the possession of initiative, self reliance and resource in a high degree. A member of a cricket or football team is also a disciplined man, obeying his captain and conforming to rules, and yet his natural powers are not impaired.

A well-trained soldier, trained I mean on common sense lines, understands the necessity for, and the uses of, discipline. He, therefore conforms to it intelligently. His training should teach him to act for himself when deprived of the immediate guidance of his superiors. What in a soldier's present training does impair instead or develop his natural powers of initiative, etc., is the habit we have got into of not trusting him to think or act for himself, or to take care of himself or of anything entrusted to him. Instances:—

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1st. Driver Jones, a transfer from the 200th to the 201st Battery, has to be sent from Aldershot to Fermoy. He is marched to the station by a N.C.O. who takes his ticket and hands it to him after he has selected a corner seat for him and ushered him into his carriage. Why not give Driver Jones his railway warrant at the Battery Office, tell him what train he has to catch and find out changes, etc., himself and have done with him? Trust him to take care of himself and to find his own way and if he fails let him suffer, but don't take every precaution against his ever learning to take care of himself. I saw this performance the last time I was at Aldershot station.

2nd. A grave has to be dug to bury a horse. A fatigue party of one N.C.O. and four gunners are told off to do two men's work. The site of the grave has been pointed out to the N.C.O. and its dimensions. It would be quite sufficient for him to take the men to the place, give them their instructions and then leave them. Not a bit of it, he remains idly there, too fine a gentleman to take off his jacket and dig, so that time that he might be spending profitably is worse than wasted.

Thirdly. On coal carrying day the A. and S. wagon is sent with Driver Smith's wheel horses and two gunners to take the Major's coals to his house. The Major lives half a mile from barracks and all these men knew perfectly well where he lives, and are quite as capable of doing the job when soldiers as they were of doing similar jobs when civilians. However Corporal Brown is sent mounted in charge of the party and the other men are not permitted to exercise the capacity which they probably possess.

These are a few instances of want of common sense in the handling of men. I know from practical experience of training a battery, to the best of my ability on common sense lines, that you can trust Driver Jones to find his way by rail, Driver Smith to deliver his Major's coals and yet bring his horses back safe and sound, and Gunners Brown, Jones, Robinson and Atkins to dig a grave and not bury themselves in it by mistake. Grown up men don't want dry nursing because fate has made them soldiers and not sailors or policemen, both equally well disciplined men.

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The "hunter's instinct."

A system of military training which will instil, or develop, initiative, self reliance and resource in officers and men need not entail a single additional hour's work per day on officers or men. All it requires is that every hour now taken up with parades, routines, fatigues or amusements should be sensibly and therefore profitably employed. I add "amusements" advisedly, because there is one more soldierly quality of the highest importance, which we sometimes find ready made in the officer, but very rarely indeed in the rank and file. I mean the "hunter's instinct." The Boer, from his manner of life for generations, possesses this attribute in a high degree; our want of it has been a fruitful source of trouble. The best schools for acquiring and developing this instinct are the hunting field and the jungle; but all sports are good and many games, if the mind be allowed to take part in them as well as the body. I had always expected that our officers, being as a rule, sportsmen, would not require the same amount of purely military training that the officers of continental armies get. My experience in the present war has disappointed me. I find that we have fewer sportsmen amongst us than we should have.

By sportsmen, I don't mean men who devote themselves to racing, covert shooting, coursing, partridge or grouse driving, croquet or ping pong exclusively, as all these amusements are classified by the sporting papers under the heading of "sport." I mean men who can ride well to hounds, can get a first spear at pig; can find and shoot the two or three coveys of partridges or grouse on a rough cheap shooting of 5,000 acres, and make a good mixed bag as well; can find and stalk a stag; kill a salmon without a gillie; stalk and kill a chalk stream trout; captain a cricket, polo or football team successively. These are the men who possess the hunter's instinct and who are therefore natural soldiers, as the best of Boers are.

I don't wish it to be thought for a moment that I despise covert shooting or driving birds, as they are both sports requiring a good eye, cool nerves and straight shooting, but they are sports in which the thinking is done by the host or his keeper and therefore do not exercise the "hunter's instinct" of the individual shooters. By racing I mean running horses for other people to ride, as *race*

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riding develops fine soldierly qualities. Now all officers can hunt if they have only strength of mind enough to give up other things for it. Moreover, I think, the poor man learns more from hunting than the rich man as he has to use his wits more to get well to the end of a good run on his only horse than his richer friend who hopes to meet his second horse at the corner of "pumped out gorse." The poor man knows that if his horse is to come out again that week he must nurse him when he can, and so learns to ride with judgment. He learns that he must ease his horse when he shows signs of distress, and he must learn what those signs are; he learns what precautions to take with an overdone horse; he learns that he cannot afford to lame his horse for want of a shoe, so takes the precaution of examining his feet and easing his back when possible at checks, and invariably before starting on the homeward road. The last is a precaution that, I trust, every hunting man, rich or poor, has the common sense and humanity to take.

Every C.O. should try to make his subalterns hunt, shoot and fish, and should give them every facility for doing so, as time spent at these sports develops soldierly qualities if spent thoughtfully. By thoughtfully I mean, in hunting, riding to hounds with judgment, studying ground, rapidly drawing deductions and forming decisions from them, committing country and ground to memory, screwing up courage to take risks, sympathizing with one's horse and learning his powers of jumping, pace and endurance. To derive the utmost benefit from hunting a man should regard the huntsman as a General and the pack as an army. He should try to fathom the huntsman's object and reason for every cast he makes, and to think whether he could not do better himself. In a run he should imagine that he has to write an account of it for the *Field* and should therefore time the start and every check, note the *locale* of every change of direction and every locateable point touched. No practice is better than writing accounts of runs afterwards, even in one's own diary, or tracing their course on a 6-inch map. I did this practically when commanding a battery in Ireland by having my reconnaissance instruction on hunting days, the enemy being the fox, the army a certain pack of hounds. Next morning the operations against the enemy were described to me

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with the 6-inch maps in the battery office. Four selected sergeants took part in these reconnaissance rides and their fame for finding their way over a country, and their knowledge of the locality of shoeing forges, bridges and fords, still lives warm in the memory of the U.H.C. Hunt. Four better soldiers never did credit to a battery than these N.C.O's after two winters of such training. I often wished in Natal that I had them with me again. However I must not let this paper degenerate into a treatise on fox hunting, as there is plenty to be read exclusively on that subject, in the pages of Beckford, Whyte Meville, Cortlandt Mackenzie and others, all of which writers I commend to the notice of young officers.

What I have said about riding to hounds applies equally to rough shooting and fishing. To find widely scattered birds in a large area of equally likely ground demands the "hunter's instinct" in a high degree. Salmon and trout fishing are fine practice for observation. A good gillie will tell you to an inch when your fly covers the fish you saw rise a quarter of an hour before. The rings the rise made in the water have passed away but the blade of grass on the bank opposite to where the splash was seen is still there, and it was by it that the gillie instinctively marked the rise, as surely as if he had placed a banderole there. To do this without a gillie, to be able to gauge the depth and colour of the water so correctly as to select the most suitable size and pattern of fly, should be the ambition of the young fisherman. The tendency of the age in all home sports is to have a fellow to do the thinking and the trouble for you. In covert shooting, grouse driving, and in salmon fishing too often, the keeper or gillie does the thinking, the loader or gillie the trouble, the "sportsman" the shooting or casting only. The true sportsman, the man who possesses and would improve his "hunter's instinct," with a view to making himself a better soldier, does the thinking and the trouble for himself.

Now so far I have considered methods of training the intelligence of the officer pleasantly to himself, but which are, as a rule, beyond the reach of the rank and file. Not always however beyond their reach: my soldier groom, who for eight years before the war had been taking hunters to meets for me in many strange countries never failed to find me with my spare horse in the most

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difficult parts of South Africa, often in the dark. His intelligence had been trained by sport. We will now suppose that the subalterns of a battery are all being thoroughly trained in field sports, that they are learning to ride to hounds, shoot and fish well, how are they, concurrently, to be trained in reconnaissance, to have good and well educated powers of observation, to be able to note the tactical situation of a village, its suitability for defence or vulnerability to attack, its provision of shops, forage, water, gas, post and telegraph offices, shoeing forge, etc., to be able to fix in their minds the direction, turnings, nature, etc., of a road and of the fences and country on each side of it; to be able to distinguish one kind of tree from another and to name them in summer or winter; to be able to obtain the necessary information about a bit of country and select artillery positions, suitable to the tactical situation; to be able to lead their batteries on to the position selected by their Major, undetected by the enemy; to find out where to water their horses; to find their way back in the dark to a place they have been to in daylight, or even to return by the same road without taking a wrong turn.

Now how is all this to be taught without taking up a lot of officer's time from sports and games? Is not route marching done, at least, once a week in winter, and do not most officers think it a deadly dull and uninstructive performance, imagining that its only objects are to keep the men from getting rusty at turning out in marching order, and the horses' shoulders from getting soft? If battery commanders will always have a tactical idea for every route march; have an imaginary escort of troops; an exposed flank and a protected one; will ride themselves where they would ride on service; will select positions when possible and make their battery leader lead on to them, even if he can only lead the Nos. 1 without the guns; will make each officer give him a short written report and rough sketch of every route march; if he will teach his officers to reconnoitre all ground in the immediate vicinity of the battery when halted; to form up the battery in battery column or quarter column whenever the head of the imaginary column halts and the ground admits; to form this column on the side of the road to the exposed flank; never to halt to water and feed without sending patrols to watch unseen ground on the exposed flank. In

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fact, if a battery commander utilises every existing opportunity of educating his officers to do always, when out of the barrack square, what they should do on service, he will turn deadly dull parades into highly instructive and interesting training. I know two battery commanders who, when in my brigade division in Ireland, did everything I have mentioned with much success.

I have constantly heard battery officers complain that they learnt little or nothing at manœuvres on a large scale. Whose fault was that? Are not manœuvres daily route marches on a large scale with frequent opportunities of occupying positions thrown in. An officer who is taught to "keep his eyes skinned, and to use his wits" will be always learning. It is almost absolute waste of the time at present devoted to certain parades that we must avoid. Waste of time because nothing useful is being taught during that parade. All training beyond mere barrack square drill should have one aim, i.e., to make soldiers do instinctively the right thing in war.

Battery commanders must practise themselves in getting away from and in keeping away from their batteries on the march. They should imagine themselves to be the O.C., R.A., of a small force and should place themselves where the O.C. of that force would be, or even in front of him where they can get an early view of the country, close behind the imaginary cavalry screen. By doing so, they will not only improve themselves in reconnaissance, but will train their subalterns in self reliance and troop leading. When a battery commander returns to his halted battery after a short absence, he should expect his subalterns to have made themselves acquainted with all the immediate neighbourhood of the halting place. He should ask: "Can I come into action on that ridge some 400 yards to our right front and is there a good field of fire from there to the N.W.?" "Can I water the horses here, or very close by, as the G.O.C. has decided to halt here if horses can be watered?" And he should get a correct answer to either question.

There is a spot on Salisbury Plain frequently used last practice season as a battery rendezvous. Many batteries spent weary monotonous hours of waiting there, but I never found an officer in any of them who could tell me whether he could water his horses there. I know that there is a well behind a clump of larches 200 yards

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from the rendezvous. I hope that next season some officer may have the curiosity to examine this well and see if water can be raised with the stores in a battery.

I found on service that there was nothing battery commanders were so slow to learn as the importance of riding sufficiently ahead of their batteries to facilitate orders from the C.R.A. reaching them from the front and to get time to select the best route over bad places before their batteries were chock-a-block on top of them.

Instruction of N.C.O's.

How can section commanders become self reliant if they are always dry nursed by their Majors? Now we will suppose that the battery commander has made his subalterns fully competent instructors, how are they to train the individual intelligence of their men? Naturally they will begin with the N.C.O's. Let us imagine that Lieut. A. having been most carefully trained in the 200th Battery at Aldershot, exchanges to the 201st Battery at Fermoy, that ideal station for sportsmen and for training field artillery. The 201st Battery has been at Fermoy for nine months, its Major, recently promoted, is still in South Africa, and the battery since its formation has been commanded by a captain (reserve) who retired from the Regiment fifteen years before. Lieut. A. is orderly officer the morning after he arrives and takes out the exercising order. He marches down hill from barracks into the town crossing a wide river by a stone bridge of six arches. He asks his trumpeter the name of the river. The boy replies, "I don't know, Sir, I never heard it." He passes through a square in which he sees an hotel and various shops, notably a tailor, a bootmaker, a grocer, a jeweller, and a bank at one corner, but he does not see a post and telegraph office. Leaving the square he turns to the right up a long street in which he notices a conspicuous farriery establishment and a soldiers' home. Having emerged from this street into the country, he asks his trumpeter where the post and telegraph office is. The boy is able to tell him correctly. He then tells the trumpeter to send up the Nos. 1 of A. and B. sub-divisions and he ascertains their names.

Sergeant C. and Corporal D. ride up.

"What is the name of that river we have just crossed, Sergeant C?"

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"The Blackwater, Sir."

"How many arches are there in the bridge, Corporal D., and what is it made of, stone, brick, iron or wood?"

"I think it is a stone bridge, Sir, but I don't know how many arches it has."

"Then go back and count them and make sure of the material of the bridge and come back and tell me. In future whenever you see a bridge note these things."

"Where does this road go to, Sergeant C?"

"To Rathcormack, Sir."

"How far off is that?"

"I don't know, Sir. I was never there."

"Send up the No. 1 of C. and you may go back to your place but tell the trumpeter the name of the river as you go back."

Sergeant E. rides up.

"Where does this road go to, Sergeant E?"

"To Cork, Sor."

"How far is it to Cork?"

"Twenty-two miles, Sor."

"How do you know?"

"Shure wasn't I born there, Sor."

"Then where is Rathcormack and what is it?"

"It's only a tiny shmall village, five miles on, Sor."

"Is there a post and telegraphic office and shoeing forge there?"

"To be shure there is, Sor."

"Then go back and tell Sergeant C. all about Rathcormack as he says he was never there."

Corporal D. now comes back and reports correctly all about the bridge and says he was delayed by his horse refusing to leave the others.

"Thank you, did you see a shoeing forge on your way through the town?" "No, Sir." "Then go back again and look for one, and always look out for forges in future." Lieut. A. had noted the stupidity of C's horse and thought it had to learn sense as well as its rider.

The battery has now reached a place where the road bifurcates, having passed through a defile between a high wooded hill to the right and a snipe bog to the left.

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A. now sends for the Battery Sergeant-Major.

"Which of these roads leads to Rathcormack, Sergeant-Major?"

"The right-hand one, Sir."

"Can I go to Rathcormack and back any other road giving a ten to eleven mile round?"

"I don't know, Sir. We always go out and back the same way."

"Is there any way across that bog to the road I see on the other side of it, which must lead into Fermoy?"

"I don't know, Sir."

"Does anyone in the battery know?"

"I don't know, Sir."

"What is the name of that hill on the right?"

"I don't know, Sir, but I believe the old rifle ranges are up there."

"Send up the Nos. 1 of C. and D. please."

A. now halts the battery and while the men are looking round their horses' feet he receives a correct report from Corporal D. about the forge in Cork Street near the Soldiers' Home.

Sergeants F. and G. now come up. Sergeant F. informs A. that the left-hand road leads to Castle Lyons, a small village two miles on and that from there the battery can return to barracks by the road on the other side of the bog. A. asks how he knew all this, and Sergeant F. replies that he sometimes went fishing on his bicycle to a small river beyond Castle Lyons.

"What's the name of that river?"

"I don't rightly know, Sir."

The battery proceeds to Castle Lyons and presently passes a boreen (*anglicè* narrow lane) apparently leading across the bog to the road on the other side.

A. tells Sergeant G. to ride along the boreen and see if it is practicable for riding horses or for guns and to come along towards Castle Lyons and report to him. Sergeant G., after a long fight, induces his horse to leave the others. The observant and intelligent A. draws a true inference from the behaviour of these horses, of which more later on.

The No. 1 of E. now rides up and reports that No. 37 has cast his off fore shoe.

"Where is the nearest forge, Sergeant H?"

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"I don't know of any nearer than barracks, Sir."

"Then ask Corporal D. and come back to me."

"Sergeant F., is there a forge in Castle Lyons?"

"I never noticed, Sir."

"Then trot on and see and come back and tell me."

Sergeant H. rides up and says there is a forge in Cork Street.

"Which is the nearest, Cork Street or Castle Lyons?"

"Castle Lyons, Sir."

"Is there a forge in Castle Lyons?"

"I don't know, Sir."

"Well I have sent Sergeant F. on there to see, but I forgot to ask him to find out if there is a post and telegraph office as well, so trot on there and find out and always note those things in passing through a village."

The battery eventually returns to barracks. A., not in the least bored and thinking that he could not possibly have done more than six miles, until he consults his one-inch hunting map of the United and Duhallow Hunts countries just arrived from Stanford by the second post. The N.C.O's whose acquaintance we have made are rather undecided in their opinion of Lieut. A. The situation was discussed in the Sergeants' Mess and N.C.O's room before stables and the conclusions arrived at were that Lieut. A. is a most inquisitive and troublesome young officer, but that he had pleasant manners and that somehow or other exercising order did not seem so long, cold and dreary as usual that morning, and that they all seemed to know a little more about the place than they had ever thought of knowing before. "But what about that blooming bridge now, what could he have wanted to know how many arches it had for. He is a rum 'un, he is."

Soon after returning to barracks, the O.C. sends for A. and asks him to go to the bank and cash a cheque for the battery pay. Knowing now where the bank was, he had no trouble about this.

At midday stables A. takes over his section and finds that Sergeant C. and Corporal D. are his Nos. 1. In the course of stables A. asks Corporal D. if he knew why he was asked the number of arches in the bride. "No, Sir, and I have been thinking what you could possibly want to know for." A. explains that, it was firstly to accustom the eye to note and take in conspicuous

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landmarks passed on the road; secondly that bridges are structures of great military importance and that therefore the habitude of instinctively examining and remembering them should be cultivated.

"Which is the last horse shod in your sub-section, Corporal D?"

The corporal proceeds to look at his shoeing list.

"You should know without looking at your list, it is No. 45. Now how do I know? Because the bright edge of the hind shoe caught my eye directly I entered the stable. That horse was shod since he came in from exercise before his legs were dried. He has therefore been kept standing in that draughty shoeing shed with wet heels. Now you see the use of training your eyes by noticing arches of bridges and everything else you pass. Send for the shoeing-smith who took that horse away before his legs were dried. In future you must have hay bands made for the drivers to bandage their horses' legs with when they come in from parade wet and muddy. Then by the time the men have changed and turned down to stables the horses' legs will be dry and the mud will brush off."

"Who is lead driver of your gun?"

"Driver Smith, Sir."

"Driver Smith who told you to clip your horses' heels so close, you have left the corn all bare?"

"Corporal D. told me, Sir."

"Well horses' heels should never be clipped bare like that. That little wisp of hair at the point of the heel is put there to act like the eave of a house and throw off the sweat and water that runs down the legs and prevents it resting in the hollow of the pastern where the hair and skin are thin and delicate. That is what causes cracked heels. Do you understand?"

"Yes, Sir."

"What happens to your own hands if you dip them in water and then let them dry in frosty air?"

"They chap, Sir."

"Well, chapped hands in a man and cracked heels in a horse are caused the same way."

In this way something may be taught to every N.C.O. and man during stables, without interfering with work. It will prevent stables becoming dreary and monotonous. In fact an officer who

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can ever find stables dreary or monotonous had better join a service not connected with horses.

Next day our friend A. continues the same instructions at exercising order, but finding the N.C.O's so ignorant he keeps one riding on each side of him all the way, taking them in turns and giving every man some information to chew the cud of.

He first asks Corporal D. "What that tree on the right is?"

Corporal D. answers correctly "an elm."

He then asks Sergeant C. what the tall tree next the elm is. He does not know, so Corporal D. is asked to tell him, which he does correctly, "A spruce, Sir."

Sergeant C. is then told to examine the two trees carefully, note the differences in shape, bark and leaf and try to fix them in his mind.

A. then asks Corporal D. where he was brought up. He answers, "At Braintree, Essex, and that is why he knows all the trees and crops by sight." Sergeant C. on the contrary was brought up in Bermondsey and was employed there in galvanizing works.

A. then explains the use of knowing the various kinds of trees, *i.e.*, that they are among the most common objects met with in most countries; that learning to distinguish one nature from another practises and quickens the eye and improves a man's powers of observation; that being able to distinguish natures of trees at a distance is a great help to layers in picking up a target, or to a man trying to find his road by a description into which trees enter.

These two N.C.O's having had as much information rammed into their heads as they will hold for one day, are sent back to their places and two more come up, Sergeants E. and F.

Just as they come up a cross roads is reached. A. tells these N.C.O's to turn round and look back at the cross roads when they have passed it, so as to note how it looks when coming from the opposite direction, to note the ash tree on the left and the copper beech and laburnum on the right. He tells them to do this always on passing cross roads so as to be able to find their way back. Both these men knew the names of the copper beech and laburnum, but they called the ash an elm. A. ascertained that they came from Bristol and Manchester respectively and had never lived more in the country than the suburbs of those towns.

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A village was reached and passed. A. then asks E. the name of the village and he says "Kilworth." He then asks F. if he could get a loaf of bread there and E. if he could get a leg of mutton. Neither of these N.C.O's being able to answer these questions, they are sent back to find out, and the trumpeter who doesn't know if a telegram can be sent from Kilworth is also sent back. All three when they return are told always to look out for the shops, etc., they had not observed.

"Sergeant E., what's the name of that cross roads we have just passed?"

"I don't know, Sir."

"Go back and find out."

E. returns and reports that he could not see anyone to ask the name of.

"Did you see a house in the N. angle of the cross roads.

"I saw a school house in one of the angles, Sir, but I don't know if it was the N. angle, and it was closed."

"Go back again and see if the house will tell you the name."

E. returns and reports that the school house has the name "Ballynacurriga National School" on a stone slab on the wall.

"Now you know that the place is Ballynacurriga Cross Roads. In Ireland school houses always have their names on them and so tell you the name of the place."

These N.C.O's are then dismissed.

"Bombardier L., who lives in that large house on the left and what is the name of the place?"

"I don't know, Sir."

"You should know the names of all the gentlemen's places and of their owners, close to where you are stationed. You may, as colonel's orderly, have to take a message or note to one of them. Go and ask at the lodge gate."

"Trumpeter, whose horse is that we have just passed with a soldier groom on him?"

"It belongs to the major of the other battery, Sir."

"What's the major's name?"

"I don't know, Sir."

"You should know the names of all the officers of the other battery quartered with yours, as you may be sent with messages, or orders, to them."

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It is quite a common thing for men of one battery not to know the names of the officers of another battery stationed alongside their own. I have know even trumpeters guilty of this. Similarly soldiers rarely learn the names of any of the places in the vicinity of their barracks, showing the utter want of the spirit of acquiring information that prevails. As all these things are so easily taught during the existing daily intercourse between officers and men, I lay stress on them, as teaching them is a beginning to arouse an enquiring spirit.

Map reading.

Very little indoor instruction will suffice to teach the A.B.C. of map reading and reconnaissance. Practical instruction can be given daily to some N.C.O's at exercising order, route marching or during marches to and from practice camps and manœuvres. Give a N.C.O. a map and tell him to ride in front of the battery and guide it to such and such a place. At halts get him and other N.C.O's to fix their position on the map. This would be a very useful employment for the captain during a march. There should be a one-inch ordnance map of, at least, fifteen miles of country round the barracks hanging up in every sergeants' mess and N.C.O's room.

In the spring when long, fast, walking exercise is wanted for conditioning horses the following is useful:—Put in orders that the battery will exercise by sections next morning, each section under its senior N.C.O., the three sections to rendezvous at . . . . at 10 a.m., the right section to go *viâ* . . . . and . . . . the centre *viâ* . . . . and the left *viâ* . . . . and . . . . All three sections to start at the same hour and the pace to be a walk. The orderly officer will meet the battery at the rendezvous and inspect the horses. It will be easy to see if the pace ordered has been exceeded. Each section then returns to barracks by one of the roads that the other section took going out. The horses are met and inspected by the captain as they enter barracks. This system has the following advantages; it makes the sergeants study their maps the night before and *en route*; it excites a spirit of emulation among the men to arrive first at the rendezvous or barracks, and they will make their horses walk their best all the way, setting up muscle and

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making the battery a fast walking one; the men knowing that they will be questioned by the major or section commander about the road during stables will keep their eyes about them and see and learn something.

It will be found that men quickly begin to take an interest in this kind of teaching and a rapid improvement in general intelligence and, also, in general conduct will be noticed. Certain, at present dreary, parades, will become interesting and the subjects taught will cause conversation and mutual catechising in the barrack-room. Exercising order may be made the means of training the drivers in scouting and reconnaissance in a small way on a simple tactical idea. This gives keen enjoyment to the men.

Equitation.

Instead of the eternal riding school and *manège* instruction in equitation, trained men's rides should sometimes be taken out into the country and the men taught:—to ride their horses away from the ranks; how to nurse their horses on a long journey; what pace to keep on a road; to select soft going where it can be found. Sometimes, especially in Ireland, a little cross country riding can be indulged in, even by drivers, and their horses made handy and clever over bad ground. In these rides, men can individually be taught a great deal by their officers riding with them. The common-sense training of the men will be extended to the horses. Nothing can be less calculated to develop the mental powers of the troop horse than his average peace time training. Following each other daily for hours round a school or *manège*, or along a smooth road, would make any horse stupid and refuse to leave his fellows where required to do so.

There is, I regret to say, an abominable habit in our Regiment of calling troop horses "hairies" or "woollies." How it arose, I know not, and the sooner it is given up the better. The men get to know of it and it does not increase their regard for the noble animal they depend upon for their efficiency, to hear him spoken contemptuously of by their officers. In most batteries there are many excellent and valuable horses, quite as good as many officers can ever hope to own, and if they are only worthy of the name "hairy" or "woolly" it is because of the want of common sense

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with which they have been trained. In many batteries what practice do N.C.O's or drivers get in riding over bad ground, until they go to manœuvres or on service? How often does one see men riding fast over rough ground on the bit rein? Whenever I see a man doing that, my first impression is that his battery commander is no horseman. There is hardly any branch of a soldier's training in which there is more scope for common sense than in equitation, and it is the branch in which, I think, one hears most of the voice of the poll parrot.

A section commander, who is a horseman and a horsemaster, has unequalled opportunities during stable hours of giving the most interesting, and to my mind delightful, instruction. Now I know some officers will say: "This is all very fine for old batteries with old subalterns and stationed in country quarters, but what are we in the 250th to 260th Batteries, with three-months-old subalterns and quartered at Woolwich, to do?" To this anticipated objection I can only reply that, observation can be trained and an enquiring frame of mind awakened and fostered anywhere. I have not suggested a single parade that is not carried on at every station. I have only filled up these parades with additional instruction, which can be given without prolonging any of them a second.

Officers stationed at Woolwich sometimes go up to London. They can train their observation by noting the number of their railway carriage, of the porter who takes their portmanteau at Charing Cross, of the hansom which he puts it in. It will soon become second nature to do this, and some day a missing umbrella may be recovered thereby. How many officers can say off hand where the number is to be found on the inside of a hansom? Noting the names of streets and of corner shops as you drive away, keeps the eye in, and I have found it very useful during fogs this winter.

On board ship you can carry on your instruction in the slack time in the afternoons. A battery which went out to South Africa in the same ship with me carried out the following routine of afternoon instruction of N.C.O's off duty. Each man was given a copy of Bartholomew's "Tourist's Map of S. Africa," which he was taught to read at the first lesson. The theatre of war was pointed out to him and the various landing ports, railway lines, their length

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and junctions, the most important strategical points and their distances apart and from the bases. Next the meaning of Dutch words in use by English speaking people in South Africa such as kopje, spruit, vlei, fontein, kloof, donga were taught. Observation was kept in practice by pointing out and explaining the different parts of the ship and its fittings and their uses and names. Transmission of orders was practised by sending verbal messages from an officer on the hurricane deck to other officers on the poop and forecastle. The sender and receiver wrote down the message as sent and as received and the name of the messenger, so that comparison and pointing out of errors were possible. The messages sent were simple military messages and orders. Ludicrous mistakes were made at first especially in the way of misplacing small words such as "to" and "on". Improvement however was rapid, as having the message as delivered read out, and the mistakes pointed out in front of their comrades put the men on their mettle and each fellow tried to do best. This exercise was complicated after a few days by sending each message through more than one mouth. Verbal instruction was also given in the duty of patrols, and this I found was of practical use when we were marching up from Estcourt to Frere, with no mounted troops.

The Artillery Handbook of Field Service gives the various distinguishing flags and lanterns used in the field. Every N.C.O. going on service or to manœuvres should learn these so that he may be able to find the G.O.C., O.C. Xth Brigade, A.O.D., A.S.C., post and telegraph office, ammunition, etc., when sent with messages. I had two or three most intelligent orderlies during the campaign who always instinctively noted these flags on riding into camp and were able to take my messages to the right place by day or night. These same men became most wonderfully good at finding their way on dark nights over difficult ground, with orders to batteries two or three miles from headquarters. On the night of the 22nd February 1900, I had to send fresh orders to eight or nine batteries scattered over a distance of three miles of country intersected by deep rocky dongas and covered with thick mimosa scrub. The orderlies had been over the ground by daylight, and they did their work so well and quickly that all batteries received their orders before midnight. I attribute the usefulness of these

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young N.C.O's to the quickening and training of their natural powers given by practice in observing trifles as they rode along with me daily.

Lord Roberts' "Forty-one years in India" contains two instances of the value of educated powers of observation. They occur in his account of the operations of the Relief of Lucknow. In each case Lieut. Roberts had to find his way in the dark over most difficult ground that he had once been over by day. That he should do so successfully was of vital importance. He did succeed, and knowing as I do the ground well, I can realise his difficulties and the nerve required to undertake the task. I recommend every young officer to study these incidents as they show what an important effect the capacity to undertake and succeed in a task which chance throws in his way, may exert in his future career. I noted that a certain subaltern in my brigade division in 1897 had a capacity for reconnaissance. I remembered this during our retirement from Spion Kop on one of the darkest and wettest nights during the campaign, when I wanted a message taken to two lost batteries. I knew that the officer in question had been in action with his battery seven days before, on the ridge where I expected that the missing batteries would be found. He found them there and brought them safely into bivouac on the south bank of the Tugela.

A weekly evening lecture to N.C.O's open to gunners and drivers who wish to come, held in the battery recreation room after tea on winter evenings is a popular institution if done on common sense lines and made interesting and amusing. The following are some subjects :—

1. The tactics of the three arms. This sounds alarming, but if confined to explaining the characteristics of the three arms, the reasons why each are found in an army instead of its consisting entirely of one, the objects of the various formations used, the necessity of placing the three arms in certain relative positions in order of march and of battle, the object of distances being kept between units on the march, the object of advance and rear-guards and outposts, etc., the difference between frontal and flanking attacks and the advantages of the latter, etc.

2. Field fortification. This should include the explanation of the various terms used in military language and borrowed from

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fortification such as *glacis*, revetment, embrasure, fascine, scarp, ramp, etc. It is wonderful how few N.C.O's know these simple terms. The object of simple field works should be explained and the necessity for all soldiers of all arms becoming handy with pick, shovel and crowbar.

3. Picturesque incidents from military history, such as the charges at Balaclava, Heavy and Light, the sieges of Cawnpore and Lucknow, the relief of the latter place, the siege of Arah, and Vincent Eyre's expediton to relieve it. These are all subjects I have used myself, and they recur to my memory. If the battery has any war services, incidents from them can be made especially interesting. Encourage questions and conversation about the subjects treated, after the lecture.

4. Stable management. The farrier, if an intelligent man, can with a little assistance, lecture on shoeing, grooming, watering, feeding and the treatment of common simple injuries and ailments, the location of the former and the symptoms of the latter. I knew a battery sergeant farrier whose lectures were so interesting that officers of other arms used to attend them. If men are allowed to smoke at these lectures they will like them all the better.

Patrols.

The question of artillery patrols is, I am glad to say, coming into prominence, and officers are forming theories about their employment. Train men to use their eyes, ears, and wits first and then select the best as patrols. Officers will get to know their men so well in the process of training that selection will be easy. Having selected men who can see, hear and use their wits, a system of using them as patrols need not be difficult to devise. Salisbury Plain offers rare facilities for the sort of instruction I suggest, as open downs, enclosed roads, streams, bridges, fords, villages, woods and cultivation can all be found, and yet I more than once saw that melancholy procession, the stereotyped "Woolwich—Charlton Park—Blackheath Road—Herbert Hospital exercising order" last summer. I trust I may never see it again. I know some battery commanders and ex-battery commanders who train or have trained their men on the lines I recommend in these notes, some probably much more thoroughly and exhaustively and with more ingenuity

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and resource than here indicated. There are others who have not got, to the same extent, the gift of teaching or of knowing what to teach. To the latter I trust that these hints may be of some use.

I was a long time a subaltern, so long that my recollection of subalterns' ideas and feelings as regards new menus of work sketched out for them in the R.A.I. "Proceedings" is still fresh and green. I trust that the recent experience of war that so many of our young officers have had may convince them that it is not more work but a more useful method of working, that is here suggested.

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THE BOARD OF ORDNANCE.

By Major O. F. G. Hogg, *p.a.c.*, R.A.

WHEN amongst other changes effected by the re-organization at the War Office introduced on 17th October, 1927, it was announced that in future a fourth Principal Staff Officer—namely a Deputy Master-General of the Ordnance—would accompany the forces in the field, the antiquity and historical importance of this office was once more brought into focus. With the exception of the Constable and the Marshal, the Master-General has a more ancient official lineage than any other officer of State connected with military affairs, the original appointment being anterior to many, which have already been swept away by the ruthless hand of time. Gone is the Commander-in-chief instituted in 1638; vanished are the Scout-Master-General, the Muster-Master-General, the Barrack-Master-General and the Commissary-General; forgotten are the Treasurer-at-War, the High Treasurer of the Army and the Secretary-at-War; only the Paymaster-General, the Judge Advocate-General, the Adjutant-General and the Quarter-Master-General remain as a link with the far-off Stuart days.

Regarding the forerunners of the Board of Ordnance, we find that in early Plantagenet times the Lieutenants of Counties were in the main responsible for the care and provision of ballistæ, darts, swords, bows, arrows and armour. Skilled craftsmen of their several trades, such as the Master Bowyer, the Master Fletcher, the Master Carpenter and the Master Smith had patents and received salaries from the Crown by way of retaining fees so that their services could be secured on demand for putting the limited armament of the period into a serviceable condition. These people, famous for concealing their art, styled themselves Masters of Thaudinances, the word being derived from Thor, the Scandinavian God of Thunder. At this period the monks, who were often fighting men seeking the salvation of their souls, undertook the care of earthworks and defensive masonry, being entrusted with the necessary moneys for their upkeep. Upon a Governor being appointed to

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a Garrison or Castle a special commission was issued under the Great Seal, appointing commissioners to take an inventory of all the implements of war. The Governor then entered into Articles of Agreement with the State whereby, in return for the supply of armour, arms, ammunition, provisions, victuals, soldiers, gunners, artificers and for the money wherewith to pay them, he would undertake to defend his Command against all traitors and enemies.

This system gradually crystallized into a State service and we learn that the official originally charged with training of Engineer and Artillery personnel together with the provision of their sinews of war was known as the Master of the Ordnance, the title of Master-General not appearing in official records until the reign of Elisabeth.

It seems that in 1321 the French had a Master of the Ordnance and in the reigns of Henry VIII and Edward I there was an officer known as the Attiliator balistarum who furnished the necessary accompaniments of the cross-bow.

There is an extant writ dated 22nd September, 1414, addressed "Nicholao Merbury Magistro operationum, Ingeniorum et Gunnarum nostrorum, ac aliarum Ordinationum nostrarum pro guerra, et Johanni Louthe, Clerico earumden operationum", so there was evidently in that year a gentleman of the name of Nicholas Merbury in charge of the engineers and artillery of the period together with their engines of destruction who had a clerk called John Louth to help him in his arduous task. Whether good Master Merbury took over his duties from a predecessor or whether his appointment was created "de novo" under the Treasury of the time we do not know, but his name is the earliest recorded in this connection. Again we are not sure if he had a direct successor or whether the office of Master lapsed after his death.

In other records John Judd, appointed in 1456, is stated to have been the first Master and so perhaps our friend Nicholas sniffed at the honour conferred upon him and in the parlance of the vulgar "turned it down". In 1483 Master Rauf Bigod was appointed for life to this, no doubt, lucrative, position together with a Clerk and a Yeoman of "Ordonnance", and from this date the existence of the Ordnance Administration has been unbroken down to our own time.

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The Board of Ordnance, of which the Master was the head, was first created as a corporate body about 1518 and consisted originally of a Master, a Lieutenant and a Clerk. A few years later a Surveyor and Storekeeper were added. These five gentlemen held office in the Tower which was the principal magazine of the country at that time.

A manuscript dated 1518 and still preserved among the archives detailed their duties and showed that they were borne on an established pay roll.

At this period England was famous for the cunning of her workmen in the art of manufacturing military weapons. The Tower was the centre of this industry and in its neighbourhood foundries, saltpetre houses, charcoal houses and sulphur houses sprang up on all sides. This part of London thus became a veritable workshop producing fire arrows, fire darts, smoke balls, arquebuses, and other lethal equipment and gave employment to numerous artificers and mechanics. These men, who followed, what was then regarded as an abstruse trade, continued the custom of obtaining patents with salaries by means of which, confining the whole trade within their small circle, they formed practically a closed guild or corporation. This led to abuses, especially during the time of the Spanish invasion, and opened the way for the more unscrupulous by engaging in fraud to enrich themselves at the expense of the State. The question of a public enquiry then became pressing and a solemn Commission was issued under which a very detailed investigation took place into the whole Office of the Ordnance. The result was a complete reformation which took place in the year 1598 when an establishment for the Board, more in keeping with later practice, was laid down. The senior official was given control of the whole business of Ordnance by land and sea under the designation of Great Master.

Under Queen Elisabeth the Office was again reorganized when the Great Master and Lieutenant became respectively the Master-General and Lieutenant-General.

A further Committee of enquiry took place in the reign of James I but little or no alteration followed upon its findings except that certain officers were punished and others removed for corrupt practices.

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Under Cromwell several alterations were made and Parliament, considering that the poundage upon a sum of £122,629 8s. 6d,, namely £3,065 was excessive, during the Lieutenant-Generalship of Major-General Harrison, annihilated that office by vote on 23rd February, 1652.

This Department was naturally considered of the first importance in Army expenditure after the Treasury, for without the essentials of war, an army or navy is useless. It thus became an important instrument of policy and at times of civil disturbance, particularly in the Great Rebellion, its possession as between King and Parliament became a matter of vital interest. The officers in charge appointed by the King would recognize no other authority and would part with neither munitions nor stores except upon a Royal Order. To meet this difficulty in the case of the Irish War, Parliament prevailed upon the King to place the Ordnance Office under orders to obey both the Lords and the Commons and when in later troubles the sovereign failed to satisfy their requirements Parliament seized the prize.

The business of the Board grew rapidly with the advent of cannon and by the reign of Charles II it was no longer the sinecure it must have been two centuries earlier. The Merry Monarch who "never said a foolish thing but never did a wise one" reconstituted the Board by Royal Warrant dated 25th July 1683 as a civil department of the State for the supply and custody of Naval and Ordnance Stores. Upon its reconstitution the Board was charged with the duty of providing armament for all ships and forts and was bound to obey equally the Lord Admiral and the Lord Treasurer, a feat almost impossible of accomplishment in these days of stringent economy. The Establishment at this period consisted of a Master-General, a Lieutenant-General, a Surveyor-General, a Clerk of Ordnance, a Principal Storekeeper, a Clerk of Deliveries, a Treasurer and a Secretary together with an establishment of 17 office clerks in addition to junior officials, engineers, gunners and labourers.

The members had to meet twice a week at 8 a.m. in the Tower to transact their business, hours which must have amounted to almost permanent overtime in those days.

The duties of the five principal Officers under the direction of the Master-General were as follows :—

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The Lieutenant-General had, in the absence of the Master-General, to receive all letters, warrants, orders, etc., and to impart them to the Principal Officers of the Board for execution. He had to keep a Minute book of the work of the Board and, in consultation with other members, consider all estimates or demands of money for stores, fortifications or other services, satisfying himself that the money was properly and carefully spent. He was responsible for maintaining all marching trains in good condition. He had to direct the practice of all master-gunners, firemasters, gunners and fireworkers on behalf of the Master-General. He was charged to give in writing under his own hand directions for the shooting off of great ordnance at the Tower upon extraordinary occasions. Finally upon his shoulders fell the responsibility for the maintenance of general discipline in connection with the inferior ministers acting under the jurisdiction of the Board.

The Surveyor-General had to survey all stores and provisions of war in charge of the Principal Storekeeper and to see that all labourers, artificers and workmen connected with the Board's activities did their duty in a diligent and proficient manner. He had to ensure that the Clerk of the Cheque kept a particular account of all daily and weekly work performed. He was responsible for the accounting of all stores and for the proof of those of a warlike variety. He combined within his person the duties of an Inspector-General and a Director-General of Stores, keeping the receipt and issue ledgers of the day. He had to maintain two counter or cheque books, by way of journal and ledger of the receipts, issues, returns and remains of every nature of store chargeable to or accountable for by the Principal Storekeeper.

The Clerk of the Ordnance had to keep a book of all orders and instructions given for the government of the Office, and to record all patents and grants, and the names of all officers, clerks, artificers, attendants, gunners and others who enjoyed the said grants or fees from the same, together with a journal recording all warrants and orders for services to be carried out, provisions to be made or supplies to be despatched. He was responsible for drawing up all estimates for the supply of stores to all ships, forts, castles and garrisons. He undertook all contract work. He assisted at all stocktaking in relation to ships, forts, magazines, etc., and kept

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receipt and issue ledgers for outstations such as Plymouth, Sheerness and Woolwich with a strict account of all moneys expended both on the provision of stores and on wages. He was the Auditor-General, the Director of Contracts and financial Adviser to the Board.

The Principal Storekeeper took charge of all stores, ordnance and munitions committed to his charge and was responsible for all issues and receipts. He could only issue stores with the consent of the other Principal Officers based on a warrant granted under the Royal Signet, the Lord High Admiral or an Order in Council. He had to keep two books. In one was placed a copy of all warrants or orders relating to proportions or deliveries, the other being a journal of the proportions or deliveries themselves. He had to be present at all deliveries of stores and to assist in taking remains. Monthly, or oftener should the Board so require, he had to produce indents for deliveries for the purpose of comparison with the Storekeeper's proportions as a check upon his accounts.

The Clerk of Deliveries was the issuing officer. He prepared the necessary orders or proportions, armed with which, after signature by the Principal Officers of the Board, he took over from the Principal Storekeeper the stores to be issued and was responsible that they were duly delivered and a receipt obtained.

The Master-General, by virtue of his office, functioned in two capacities, military and civil; so also did the Lieutenant-General. In their former capacity they acted respectively as Commander-in-chief and second in command of the Artillery and Engineers.

In his civil capacity the Master-General was entrusted with the entire management of, and supreme control over, the whole Ordnance Department. All warrants from the King, the Privy Council or the Admiralty were directed to him personally and not to the Board, and under his direction and authority the Board carried them out. He alone could do any act which, if he did not interfere, could be normally carried out by the Board. He could order the issue of money, but as a safeguard the order had to be executed in the prescribed manner, i.e., by debenture signed by three officers of the Board.

Besides the individual duties just described the Principal Officers had duties as a board to perform. According to the war-

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rant of Charles II they had to "observe, follow and see performed all orders, warrants, and significations of the Master of Ordnance whether grounded upon warrants from Us, Our Privy Council, or Lord High Admiral of England (for Sea Affairs), and in all things to obey him, jointly and severally, in their respective places, as Master-General of Ordnance, and such directions as from time to time he should judge fit and necessary to give for Our Service".

The Master-General was at all times supreme but the decisions of the Board were bounded by a majority vote. In the absence of the Master, however, each Principal Officer was definitely responsible to Parliament for his own department as well as for the joint action of the assembled Board.

Under the Principal Officers were officials known as Inferior Officers and Under Ministers.

The Inferior Officers consisted of the 17 clerks before mentioned, the Deputy Keeper of the Armoury, the Keeper of Small Arms, armourers and storekeepers at outstations.

The Deputy Keeper of the Armoury was responsible for the custody of all defensive arms and armour committed to the Tower. He had to maintain them in a serviceable condition and to receive no further supplies unless they were duly proved and marked and without due notice to the Clerk of the Ordnance. He was not allowed to issue any arms without a warrant signed by three Board Officers.

The Keeper of Small Arms carried out the same duties in regard to muskets, etc., as the Deputy Keeper of the Armoury did in regard to defensive armour.

The storekeeper and clerks carried out the duties ordinarily assigned to such posts.

The Under Ministers included:—

The Principal Engineer who was to be well skilled in geodesy, mathematics and mensuration as well as being versed in the art of fortification including a knowledge of timber, stone and architecture both military and civil. He was, as his name implied, responsible for all defensive works.

The Master-Gunner of England who was to teach gunners the art of shooting with great ordnance and mortar pieces once a month in winter and twice in summer. He also had to certify the ability

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of gunners or scholars as qualified for the Service. In addition he kept a roster of all gunners, their professions and their places of abode so that quarterly musters could be made.

The Firemaster who had to exercise those under his command once or twice a week in mortar practice and to see that they were kept continually at work in the Laboratory making powder, rockets, and ammunition generally.

The Proof-Masters who were concerned with the inspection and acceptance of stores for the service. After such stores had passed proof they inscribed upon them the Crown mark.

The Wagon-Master who was responsible for the maintenance of all Royal and Military carriages and trains of Artillery and for ensuring that they were kept in a state of good repair.

The Clerk of Cheque who was the principal timekeeper; responsible to the Board that all labourers kept strict hours and did not loiter or absent themselves.

The Purveyor who was charged under the Board to provide such ships, vessels, lighters and boats as the affairs of the Board might require at favourable contract rates.

The following table shows the rate of pay at this period for the principal officials who functioned on or under the Board:—

Appointment.	Salary per annum.
The Board.	
Master-General	£1500
Lieutenant-General	£800
Surveyor-General	£400
Clerk of the Ordnance	£400
Storekeeper	£400
Clerk of the Deliveries	£300
Treasurer of the Ordnance	£500
Secretary of the Ordnance	£200
Under Ministers.	
Principal Engineer	£300
Second Engineer	£250
Third Engineer	£150
The Master-Gunner of England	£190
The Firemaster	£150

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The Proofmaster	£20
The Wagon Master	£100
Clerk of the Cheque	£60
Purveyor	£40

Inferior Officers.

Clerks	Between £75 and £50
Deputy Keeper of the Armoury	£60
Keeper of Small Arms	£80
Storekeepers	Between £120 and £20

Besides these, gunners got a shilling a day, labourers ten shillings a week, fireworkers £40 a year and the Messenger £60 a year.

From the foregoing therefore we see that the Master-General and Principal Officers of the Board of Ordnance, to whom so large an amount of public treasure was thus necessarily entrusted were persons of high political importance, subordinate only to the Treasury and Auditors of Imprest in matters of account and to the Secretary of State for the issue of military equipment.

After the Restoration the Department, as we have seen, became divided into two distinct branches, the Military, which finally developed into the Royal Regiment of Artillery and the Corps of Royal Engineers under the direct command of the Master-General, or in his absence, the Lieutenant-General, and the Civil which became, for all intents and purposes, a ministry of supply charged with the supply, care and maintenance of stores, buildings, and lands together with the administration of the military branch. From this date until the abolition of the Board in 1855 the office of Master-General was always held by an illustrious soldier, and up till 1828 this officer had a seat in the Cabinet, eventually becoming, on the creation of the post of Commander-in-chief, the military adviser to the executive Government. Such advice was naturally often in request and no one was better qualified for the task, since the objection of having the Commander of the Forces, whose main role is to carry out policy, in the inner councils of the nation could not be levelled against the Master-General who only commanded a very small and select corps of scientific men. The Office therefore came to be regarded as a prize for the most distinguished soldier of his time.

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The Order in Council of 25th July, 1683, lays down the duties of the Engineers and Artillery, i.e. of the military branch of the Ordnance with great exactness. The Engineer-in-chief was to be a man of considerable scientific attainments capable of superintending the erection of fortresses, both at home and abroad, and of conducting siege operations, and the engineers under him became a definite part of the military branch of the Ordnance administration. The first establishment of fifty engineers was fixed by Order in Council dated 22nd August, 1717. In 1759 their establishment was reformed, their military rank dating from 14th May, 1757, and all engineer officers subsequently entering the Ordnance Department were commissioned by the Sovereign on the submission of the Master or Lieutenant-General. N.C.O's and men were first raised by enlisting in 1788 the artificers then in the employment of the Board. Such were the beginnings of the Sappers. The origin of the Royal Artillery is derived from the same source, the gunners being a species of militia under the control of the Master-Gunner of England. The first two companies of gunners and matrosses were raised under a Royal Warrant of 27th November, 1715, for service in North Britain and a further warrant of 26th May of the following year definitely authorized the first regimental establishment. The officers' commissions were given by the Crown on the submission of the Master or Lieutenant-General. Henceforth these scientific branches of the Army were administered by the Board until they were taken over by the War Office.

The duties of the Civil Branch of the Board comprised the following:—

(1) Stores.
(2) Lands.
(3) Survey of the United Kingdom.
(4) Defensive works.
(5) Contracts.
(6) Manufacturing establishments.

Stores.

Although the Board was originally charged with the supply, custody and issue of all stores and no slur was ever cast upon the efficiency of their administration, the Secretary-at-War towards the end of the 18th century initiated another service of supply and

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established independent depots in the British Isles in 1794. Fortunately the contractors concerned were men of unimpeachable integrity as apparently no check was ever made upon price or quality. These depots grew in number till eventually 109 existed for the military service. Such an independent source of supply without the careful checks and counterchecks of the Ordnance system led to duplication and chaos. Stores were issued sometimes by order of the Commander-in-chief, sometimes by the Secretary-at-War and at other times by the General of the district, the Quarter-Master-General, the Surgeon-General and others. In order to attain some measure of uniformity in the issues which took place, the Office of Storekeeper-General, independent of the Board, was instituted on 8th March, 1808. This appointment, however, did not give complete satisfaction and left something to be desired, for in May, 1822, these Army stores, together with the store branch of the Commissariat were transferred to the Board of Ordnance, the post of Storekeeper-General being abolished. After these absorptions the reorganization of the civil branch and the revision of its establishment became necessary and this was carried out by a Royal Warrant dated 19th December, 1825.

Lands.

From the reign of Queen Ann Parliament, as occasion required, conferred statutory powers on the Board to acquire lands as necessary. The Board therefore used to carry out duties now assigned to the Comptroller of Lands, War Office.

Survey.

As a measure of defence, the Board was originally entrusted with the survey of the United Kingdom. This duty was said to have originated in Scotland after the rebellion of 1745 when General Wade was Lieutenant-General of the Ordnance and to have commenced under General Roy who commanded a body of infantry at Fort Augustus. Eventually the idea of surveying was expanded to cover the whole kingdom and the earlier attempts, which had been made in 1783 and 1784 were, in 1791, put upon a definite footing by the Duke of Richmond, then Master-General. In 1824 a survey of Ireland was commenced and in 1841 the Royal Assent was given to complete the survey of Great Britain, Berwick-upon-

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Tweed and the Isle of Man. The geological survey passed out of the Board's control in 1845 and the Ordnance Survey in 1855, the latter being transferred to the War Office. The Ordnance Survey, however, did not long remain under the care of the Secretary of State for War, as in 1870 it was handed over to the Commissioner of Works. After a sojourn of 19 years it found its present resting place, the Board of Agriculture and Fisheries, in 1889.

The Board were therefore responsible for the present duties of the Director-General of Ordnance Survey.

Defensive Works.

The Ordnance Department had always been charged with the care and maintenance of all buildings connected with defence or needed for troops, such as barracks or hospitals, and in 1717 the Board instituted the system of stoppages for barrack damages. In order, however, to speed up the building of new barracks which were urgently needed, a special officer was detailed in 1792. In 1793 he was appointed Superintendent-General of Barracks and by Royal Warrant of 24th March, 1795, received the title of Barrack-Master General to the Forces. A further warrant of 24th March, 1795, defined the powers as between this official and the Board of Ordnance. This system by which an executive officer of the Army liable to the Mutiny Act, was entrusted with the expenditure of public funds without a seat in the House or being controlled financially by any responsible Minister, proved a failure and the office of Barrack-Master-General was abolished in 1822 and his duties re-transferred to the Board.

The Board therefore carried out the duties of the Director of Fortifications and Works (now the Director of Works) and the Assistant Director of Quartering.

Contracts.

The Board in this respect carried out the duties of the Director of Army Contracts.

Manufacturing Departments.

The Board had charge of the manufacturing departments. The Ordnance Factories were and are still situated in the Royal Arsenal at Woolwich, at Waltham Abbey and at Enfield Lock. In 1667

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certain works and batteries were thrown up on Woolwich Warren as a protection against the Dutch fleet invading the Thames. In 1681 butts for the proof of Ordnance were erected there and in 1695 the "Barn" standing in the Tilt-Yard at Greenwich was taken down and re-erected on Woolwich Warren, then the place for disposal of ships, carriages and saltpetre. The Laboratory too underwent a similar removal from the Tower. The beginning of the manufacturing establishments really dates from the accident at Moorfields on 16th May, 1716, when a gun, until recently on exhibition at the Rotunda, burst during re-casting with dire results. A great confabulation followed with the result that a suitable site was finally selected on the Warren upon which a brass foundry was completed in 1717, the first Master founder being Andrew Schalk who was engaged from 29th September, 1716, at the then large salary of £5 a day. He served in this capacity for 60 years. Originally the Royal Gun Factory which developed from this humble origin manufactured brass cannon only, all iron ordnance being purchased from the trade. The proof of all guns has always been carried out at the Royal Arsenal and by a Royal Warrant dated 24th January, 1783, this duty was placed under the Officers, Royal Artillery, the Inspector of Artillery being the responsible proof officer.

The present site of the Arsenal has intimate connections with the late Board of Ordnance in both its military and civil aspects. The building now known as the Model Room and built by Sir John Vanburgh—the architect of Blenheim Palace—in 1719 was the home of the first companies of Artillery before it became the Shop in 1741. It stands on the site of a very much older building, then known as Tower Place, which became in 1683 the official residence of the Lieutenant-Generals of the Ordnance.

The Ordnance did not manufacture gunpowder till 1759. Previous to that date supplies were furnished by the East India Company. The powder works at Waltham were established on the site of earlier mills about 1788 and both the factories there and at Faversham were under the control of an Artillery Officer styled the "Inspector of the Manufactory" in 1811. The connection of the Ordnance with the Small Arms trade dates from June 1631. In that month a Commission was issued by Charles I to certain armourers and gun makers in the City of London appointing them

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Commissioners for certain purposes in connection with their trade. They agreed to supply the Tower stores, on seven days' notice, with 1500 armourers and as many muskets every month and to train up apprentices to their trade so that the Realm might be supplied by these means and thus rendered independent of foreign aid. A standard pattern was adopted at the Ordnance Office and all arms in the Train Bands had to conform to it. Small arms were first manufactured by the Board under an Assistant Inspector at the Tower in 1804; this consisted of making rough stocks and assembling other parts supplied from Birmingham. In 1807, however, a factory was set up at Lewisham for the manufacture of locks and barrels. Four years later the Board acquired land at Enfield Lock and between 1811 and 1816 the present rifle factory was built upon the site and Lewisham closed down. Eventually in 1855 the Royal Small Arms Factory was reorganized upon more modern lines and the entire control entrusted to an Artillery officer—Colonel Dixon.

The Board therefore performed the duties now carried out by the Director of Factories, the Inspection Departments and the Proof and Experimental Officer.

In connection with manufacturing operations the Board had to deal with inventors, and to aid the Master-General in this respect the Ordnance Select Committee, consisting of military and civilian members, was appointed in 1805. This Committee was dissolved and reconstituted in 1859 when civilians were excluded. It was finally abolished in December 1868.

We thus see that as the years rolled by the Board grew in importance and at the beginning of the last century its prestige had grown to such dimensions that it was granted the right to bear arms. The following is a transcript of the original patent :—

"To all and Singular to whom these Presents shall come Sir George Nayler, Knight, Garter Principal King of Arms, Ralph Bigland, Esquire, Clarenceux King of Arms, and Edmund Lodge, Esquire, Norroy King of Arms send greeting. Whereas His late Most Sacred Majesty by Warrant under his Royal Signet and Sign Manual bearing date the nineteenth day of July 1806 signified unto the late Most Noble Charles, Duke of Norfolk, then Earl

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Marshal and Hereditary Marshal of England that He had been pleased to give and grant unto THE RIGHT HONOURABLE AND HONOURABLE THE BOARD OF HIS MAJESTY'S ORDNANCE His Royal License and Authority to bear the Arms hitherto used by them viz: "AZURE THREE FIELD PIECES IN PALE OR ON A CHIEF ARGENT THREE CANNON BALLS SABLE" with the following crest "OUT OF A MURAL CROWN A DEXTER HAND HOLDING A THUNDERBOLT ALL PROPER" together with the motto "SUA TELA TONANTI" and to allow the said BOARD to bear for supporters to the said Arms on either side "A CYCLOPS IN THE EXTERIOR HAND OF THE DEXTER A HAMMER IN THAT OF THE SINISTER A PAIR OF FORCEPS RESTING ON THE SHOULDER OF EACH RESPECTIVELY ALL PROPER" as in the painting annexed unto the said Royal Warrant the said Arms and Supporters to be borne and used forever hereafter by the said BOARD on a Common Seal, Shields, Banners or otherwise according to the Laws of Arms, the same being first duly exemplified and Recorded in the Herald's Office, otherwise His Majesty's said License and Permission to be void and of none Effect And forasmuch as Henry Thomas Howard-Molyneux-Howard Esquire, commonly called the Right Honourable Lord Henry Thomas Howard-Molyneux-Howard Deputy (with the Royal Approbation) to his Brother the Most Noble Bernard Edward, Duke of Norfolk, Earl Marshal and Hereditary Marshal of England hath by Warrant under his Lordship's Hand and seal bearing date the twelfth day of May instant authorised and directed us to exemplify the said Armorial Ensigns and Supporters accordingly. Know ye therefore that the said Garter, Clarenceux and Norroy in obedience to the Royal Command in pursuance of His Lordship's Warrant and by virtue of the Letters Patent of Our several Offices to each of Us respectively granted do by these Presents exemplify under the said RIGHT HONOURABLE AND HONOURABLE THE BOARD OF HIS MAJESTY'S ORDNANCE the Arms following, that is to say "AZURE 3 FIELD PIECES IN PALE OR ON A CHIEF ARGENT 3 CANNON BALLS PROPER" And for the Crest "OUT OF A MURAL CROWN ARGENT A DEXTER CUBIT ARM THE HAND CLASPING A THUNDERBOLT WINGED AND ENFLAMED PROPER" with the Motto following "SUA TELA TONANTI" and I the said Garter do by the Presents exemplify unto the said BOARD

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the Supporters following, that is to say On either side "A CYCLOPS IN THE EXTERIOR HAND OF THE DEXTER A HAMMER AND IN THAT OF THE SINISTER A PAIR OF FORCEPS RESTING ON THE SHOULDER OF EACH RESPECTIVELY ALL PROPER" the whole as in the margin here of more plainly depicted the said Arms, Crest and Supporters with the Motto to be borne and used for ever hereafter by the said RIGHT HONOURABLE AND HONOURABLE THE BOARD OF HIS MAJESTY'S ORDNANCE on a Common Seal, Shields, Banners or otherwise according to the Tenor of the said Royal Warrant and the Laws of Arms. In witness thereof We the said Garter, Clarenceux and Norroy Kings of Arms have to these Presents subscribed our Names and affixed the Seals of Our several offices this sixteenth day of May in the fourth year of the Reign of Our Sovereign Lord George the Fourth by the grace of God of the United Kingdom of Great Britain and Ireland, King, Defender of the Faith, etc. and in the Year of Our Lord one thousand eight hundred and twenty-three.

George Nayler	Ralph Bigland	Edmund Lodge
Garter Principal	Clarenceux	Norroy
King of Arms.	King of Arms.	King of Arms."

In 1830 the Board of Ordnance was reduced to three members, the posts of Lieutenant-General and Clerk of Deliveries being abolished.

In December 1833 a Commission was issued to the late Duke of Richmond and others to enquire into the practicability and expediency of consolidating the various Departments connected with the civil administration of the Army. The object of this Commission was not to abolish but to extend the Ordnance system by incorporating the War, the Paymaster-General's the Commissariat and other smaller departments into a Board under a Civil Commissioner of Cabinet rank, transferring the command of the military Ordnance Branch to the Commander-in-chief. This was the forerunner of other Commissions relating to Ordnance expenditure, and although the end was not yet in sight it was near at hand. The fight raged for another 20 years and arguments and counter-arguments for and against consolidation were freely heard. The Duke of Wellington was strongly opposed to the abolition of

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the Board and wrote to Lord Fitzroy Somerset, Lord Melbourne and Earl Russell in 1837, 1838 and 1849 in no uncertain terms. His efforts, however, together with those of others who agreed with him proved unavailing and the doom of the Board of Ordnance was sounded in 1855. The Secretary-at-War, from the traditions of his office, had always been antagonistic to the Board and upon his advice and counsel Lord Palmerston, then Prime Minister, signed its death warrant. After 400 years of corporate existence the Board had its letters patent revoked and its duties vested in the War Department. The London Gazette of the 25th May promulgated the decree in the following terms:—

"The Queen has been pleased to order letters patent to be passed under the Great Seal, revoking the letters patent of the Master-General, Lieutenant-General, and Principal Storekeeper of the Ordnance".

"Her Majesty has been likewise pleased to order letters patent to be passed under the Great Seal, vesting the Civil Administration of the Army and Ordnance in the hands of Fox Baron Panmure, one of Her Majesty's Principal Secretaries of State".

Later on in the same year an Act of Parliament, 18 and 19 Victoria, Cap. CXVII, was passed "for transferring to One of Her Majesty's Principal Secretaries of State the Powers and Estates vested in the Principal Officers of the Ordnance".

Since that date, therefore, warlike stores for the Army have borne the mark W↑D instead of B↑O, and the Office of Master-General was abolished. It was not revived till 1904 when it became an Army appointment upon the formation of the Army Council.

Many well-known characters in history figure amongst the Masters-General. Their names, together with those of the other Principal Officers of the Board, are enumerated in the Appendix, but a few may be mentioned here to show the distinguished official ancestry of the fourth Military Member of the Army Council.

Ambrose, Earl of Warwick, the eldest surviving son of the attainted John Dudley, Duke of Northumberland and grandson of the notorious Edmund Dudley "the extortioner" was restored through the special favour of Queen Mary and was made in 1559 Master of the Ordonnance for life. He died in 1589. In 1585

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Sir Philip Sidney of Penshurst, Kent, was made a Joint-Master until he was killed in the following year at the Battle of Zutphen. In 1702 the famous Duke of Marlborough assumed this office and again in 1714 when he held it till his death in 1722.

Other names like those of the Marquis of Granby, Viscount Townshend, the Dukes of Argyll, Richmond, Montagu and Hamilton figure on the list, and that of John, Earl of Chatham, the illustrious son of a still more illustrious father, William Pitt the elder, together with that of the Iron Duke, indicate to us that the Master-Generalship was considered an honour to be bestowed only upon the most eminent men.

The last Chief Executive Officer of the Board was Fitz-Roy, Lord Raglan, who was promoted Field-Marshal in 1854. He succeeded Lord Hardinge in 1852 and was killed at Sebastopol in the year that the Board was abolished.

Such then is the history of the Board of Ordnance which during the course of its long existence has played no mean part in the story of our realm. One cannot but admire the system of checks and counter-checks introduced to safeguard the public purse when possibly the public conscience was not so fully developed as it is now, or fail to realize that as an institution it served an admirable purpose. In these days when whispers of reorganization float idly on the night airs and shadows of Ministries of Supplies and Defence are faintly cast upon the wall at noon, we may well wonder whether the shades of past Masters, disturbed from their deep slumbers, are murmuring amongst themselves "There is nothing new under the Sun".

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List of Masters and Masters General of the Ordnance down to the present time.

Date.		Name.
1414		Nicholas Merbury.
1456		John Judd (not authentic).
1475		John Sturgeon.
1483—1485		Rauf Bigod.
1485—1513		Sir Richard Gyleford.
1513		George, Lord Carew.
1537—1544		Sir Christopher Morris.
1544—1548		Thomas 1st Lord Seymour of Sudeley.
1548—1554		Sir Philip Hoby.
1554—1560		Sir Richard Southwell.
1560—1589		Ambrose, 1st Earl of Warwick.
1585—1586	(Joint Master)	Sir Philip Sidney.
1597—1600		Robert 2nd Earl of Essex.
1603—1606		Charles 1st Earl of Devonshire.
1608—1629		George 1st Earl of Totnes.
1629—1630		Horatio 1st Lord Vere of Tilbury.
1634—1642		Mountjoy 1st Earl of Newport.
1642		John 1st Earl of Peterborough.
1644		Henry 1st Lord Percy of Alnwick.
1644—1652		Ralph 1st Lord Hopton of Stratton.
1660—1664		Sir William Compton.
1664—1669	(In Commission)	John 1st Lord Berkeley of Stratton.
		Sir John Duncombe.
1670—1679		Sir Thomas Chicheley.
1679—1682	(In Commission)	Sir Thomas Chicheley.
		Sir John Chicheley.
		Sir William Hickman.
1682—1689		Sir Christopher Musgrave.
1689—1690		George 1st Lord Dartmouth.
1693—1702		Frederick 1st Duke of Schomberg.
1702—1712		Henry 1st Earl of Romney.
1712		John 1st Duke of Marlborough.
1712		Richard 4th Earl Rivers.
1714—1722		James 4th Duke of Hamilton.
1722—1725		John 1st Duke of Marlborough.
1725—1740		William 1st Earl of Cadogan.
1740—1742		John 2nd Duke of Argyll.
1742		John 2nd Duke of Montagu.
1742—1749		John 2nd Duke of Argyll.
1755—1758		John 2nd Duke of Montagu
1759—1763		Charles 3rd Duke of Marlborough.
		John 1st Viscount Ligonier. (Afterwards 1st Earl of Ligonier).
1763—1770		John Marquis of Granby.
1772—1782		George 1st Marquess Townshend.
1782—1783		Charles 3rd Duke of Richmond.
1783—1784		George 1st Marquess Townshend.
1784—1795		Charles 3rd Duke of Richmond.
1795—1801		Charles 1st Marquess Cornwallis.
1801—1806		John 2nd Earl of Chatham
1806—1807		Francis 1st Marquess of Hastings.
1807—1810		John 2nd Earl of Chatham.
1810—1818		Henry 1st Earl of Mulgrave.
1818—1827		Arthur 1st Duke of Wellington.
1827—1828		Henry 1st Marquess of Anglesey.
1828—1830		William 1st Viscount Beresford.
1830—1834		Sir James Kempt.
1834—1835		Sir George Murray.
1835—1841		Richard 1st Lord Vivian.
1841—1846		Sir George Murray.
1846—1852		Henry 1st Marquess of Anglesey.

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1852	Henry 1st Viscount Hardinge.
1852—1855	Fitz-Roy 1st Lord Raglan.

(Board of Ordnance Abolished).

(Institution of the Army Council).

1904—1907	Sir James Wolfe Murray.
1907—1913	Sir Charles Hadden.
1913—1916	Sir Stanley von Donop.
1916—1920	Sir William Furse.
1920—1923	Sir John Du Cane.
1923—1927	Sir J. F. Noel Birch.
1927	Sir Webb Gillman.

Principal Officers of the Board of Ordnance.

Date.	Lieutenants and Lieutenants-General.
1532	Sir Christopher Morris.
1554	Sir Richard Southwell.
1562	William Bromfield.
1565	Edward Randolph
1576	Sir William Pelham.
1588	Sir Robert Constable.
1529	George 1st Earl of Totnes.
1608	Sir Roger Dallyson.
1616	Sir Richard Moryson.
1626	Sir Richard Haydon.
1627	Sir John Heydon.
1648	Sir Walter Erle.
1650	Major-General Harrison.
1660	William Legg.
1670	David Walter.
1679	George 1st Lord Dartmouth.
1682	Sir C. Musgrave.
1687	Sir Henry Titchbourne.
1689	Sir Henry Goodricke.
1702	John 1st Lord Granville of Potheridge.
1705	Thomas Erle.
1712	John Hill.
1714	Thomas Erle.
1718	Thomas Micklewaite.
1719	Sir Charles Wills.
1742	George Wade.
1748	John 1st Viscount Ligonier.
1757	Lord George Sackville.
1757	John Marquis of Granby.
1763	George 1st Marquess Townshend.
1767	Henry Seymour Conway.
1772	Jeffrey 1st Lord Amherst.
1782	Sir William Howe.
1804	Sir Thomas Trigge.
1810	Sir Hildebrand Oakes, Bt.
1823	William 1st Viscount Beresford.
1824	Sir George Murray.
1825	Sir W. H. Clinton.
1829	Lord Robert Somerset.
1831—1854	(Office Abolished).
1855	Sir Hew D. Ross.

Date.	Surveyors and Surveyors General.
1543	Henry Johnson.
1545	Anthony Anthony.
1566	Henry Iden.
1572	Thomas Pinner.
1576	William Jourden.
1595	William Partridge.
1599	Sir John Davis.
1602	John Linewraye.
1606	Joseph Earth.
1608	Sir John Kay.
1624	Richard Kay.
1625	Sir Alexander Brett.
1627	Sir Paul Harris.
1629	Sir Thomas Bludder.
1635	Francis Coningsly.
1648	George Payler.
1660	Francis Nichols.
1669	Sir Jones Moore.
1682	Sir Bernard de Gomme.
1685	Sir Henry Shere.
1689	John Charleton.
1702	William Bridges.
1714	Michael Richards.
1722	John Armstrong.
1742	Thomas Lascelles.
1750	Sir Charles Frederick.
1782	Thomas Pelham.
1783	John Courtenay.
1784	James Luttrell.
1789	George Cranfield Berkeley.
1795	Alexander Ross.
1804	John Murray Hadden.
1810	Sir Robert Moorsom
1820	Ulysses 2nd Lord Downes.
1827	Sir W. C. Owen.
1828	Sir Herbert Taylor.
1829	Sir Henry Fane.
1830	Sir Robert Spencer.
1830	W. L. Maberly.
1832	Lieut.-Colonel C. R. Fox.
1834	Lord Edward Somerset.
1835	Sir R. S. Donkin.
1841	Colonel Jonathan Peel.
1846	Major-General C. R. Fox.
1852	Sir G. H. F. Berkeley.
1853	The Honourable Lauderdale Maule.

(Board abolished in 1855).

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Date.	Principal Storekeepers.
1544	John Leame.
1557	John Watson.
1572	Richard Bowland.
1589	Thomas Bedwell.
1595	John Lee.
1603	Sir Amias Preston.
1609	Sir Roger Ayscough.
1612	Samuel Hales.
1612	John Hammond.
1614	Nedtracy Smart.
1614	Shackerley Tracy.
1620	Thomas Powell.
1620	John Gooding.
1627	Thomas Powell.
1627	Richard Marsh.
1643	Richard Marsh.
1648	Thomas Whittings.
1648	John Falkner.
1660	Richard Marsh.
1672	Sir George Marsh.
1674	Edward Conyers.
1683	William Bridges.
1685	Thomas Gardiner.
1691	William Meesters.
1701	James Lowther.
1708	Robert Lowther.
1710	Edward Ashe.
1712	Dixie Windsor.
1717	Sir Thomas Weate.
1722	George Gregory.
1746	Andrew Wilkinson.
1762	Sir Edward Winnington.
1765	Andrew Wilkinson.
1778	Benjamin Langlois.
1780	Henry Strachey.
1782	John Aldridge.
1783	Henry Strachey.
1784	John Aldridge.
1795	Mark Singleton.
1806	John McMahon.
1807	Mark Singleton.
1829	F. W. Trench.
1830	The Honourable Henry Dundas.
1834	J. R. Bonham.
1835	Lieut.-Col. T. H. G. Anson.
1841	J. R. Bonham.
1845	Sir Thomas Hastings.

Date.	Clerks to the Ordnance.
1414	John Louth.
1483	John Stoke.
1513	William Blacknell.
1536	William Huxley.
1545	John Rogers.
1554	William Painter.
1595	Sir Stephen Ridlesden.
1603	Sir Stephen Ridlesden.
1603	John Ridlesden.
1607	John Ridlesden.
1607	Francis Morice.
1638	Sir Edward Sherburne (Sr.).
1638	Sir Edward Sherburne (Jr.).
1648	John White.
1656	Lewis Audeley.
1660	Sir Edward Sherburne (Jr.).
1689	John Swaddell.
1690	Sir Thomas Littleton.
1696	Christopher Musgrave.
1714	Edward Ashe.
1718	Thomas White.
1731	Leonard Smelt.
1740	William Rawlinson Earle.
1772	Charles 1st Lord Somers.
1782	Gibbs Crawfurd.
1783	Humphrey Minchin.
1784	Gibbs Crawfurd.
1794	John Sargent.
1802	The Honourable William Wellesley Pole.
1806	John Calcroft.
1807	The Honourable William Wellesley Pole.
1807	The Honourable Cropley Ashley Cooper.
1811	Robert Ward.
1823	Henry 1st Viscount Hardinge.
1828	Spencer Perceval.
1830	Charles Tennyson.
1831	T. F. Kennedy.
1832	Lieut.-Col. L. Maberley.
1834	Sir E. G. R. Owen.
1835	Colonel A. L. Hay.
1839	Captain J. W. D. Dundas.
1841	Captain Boldero.
1845	Lord Arthur Lennox.
1846	Col. The Honourable George Anson.
1852	Colonel F. Dunne.
1853	William 1st Lord Emly.

(Board abolished in 1855).

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ARTILLERY UMPIRING.

By Captain G. L. Appleton, R.A.

THE War Office exercises of last autumn again demonstrated the many difficulties which beset the artillery umpire. The writer's impressions were gained while umpiring on the Westland side, and do not necessarily apply to Eastland where different methods may have been used.

Each artillery brigade was provided with five umpires, nominally on a scale of one for brigade H.Q. and one for each battery. These were usually organized as a forward party of three, working in O.P's and with forward troops, and a rear party consisting of the senior brigade umpire and one assistant working at Brigade H.Q. and among batteries. A forward umpire report centre for each artillery brigade was established, communication between this and the senior brigade umpire being maintained by a motorcyclist despatch rider and by the senior umpire's car. The "human bullet" principle was avoided as far as possible. Umpires did not attempt the impossible task of dealing with individual opportunity targets but contented themselves with trying to paint from time to time the general artillery picture to infantry umpires. The only exception to this was in the case of set-piece attacks when time was often available to indicate to umpires the precise place, time, and nature of artillery fire.

This was the organization in theory and so far little fault can be found with it. But practical difficulties were many. At the beginning of the day the forward party had firstly to get into the O.P. areas and see the area observed and ascertain if communications and control made fire a practical proposition. This at once involved dispersion of umpires, particularly in the case when a brigade was superimposed on an entire divisional front. It could usually be assumed that the infantry on either side knew what artillery support was behind them, but artillery umpires had to seek out the "enemy" infantry umpires and tell them the time, locality, and intensity of fire which was being brought to bear on them. Here various practical difficulties at once arose. The

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infantry umpires were widely scattered over a length of front. Was one to seek them out piecemeal and attempt to "paint a picture" to each of them, *IF* they could be found? Or was one to wait in the locality where perhaps a concentration was to be fired, in order to penalize any enemy who might be there at the right place and time?

Umpires of an opposing side are always hard to find, and when one has found them they are inclined, humanly enough, to have rather a local view and to be a little apathetic about the somewhat nebulous opposing artillery. By the time all umpires are found the attack has probably moved a mile or more and the situation has completely altered. If one adopts the other plan, and waits in a shelled area the odds are strongly in favour of no one coming through it at all. On the other hand if one does not wait there it is very likely that a continuous column of infantry in fours with transport will move over the precise spot which a battery is steadily shelling at four rounds a minute.

Let it be assumed that the artillery umpires had tried by one means or another and with varying success, to put the opposing infantry umpires in touch with the situation. The battle had now rolled on. What was to be done? There seemed to be two alternatives. One could send back a report to the brigade senior umpire and then wait for news of further action by the brigade, either through the report centre or from the O.P's. Alternatively one could wander about among the infantry and try to go on "painting a picture" to elusive infantry umpires, and hope that instructions from the brigade umpire would reach one from the report centre. In either case the action of the artillery umpire tended to be rather futile. He either did nothing or painted a picture which probably was not in accordance with the actual situation. One could not do much picture painting without making oneself rather a nuisance to infantry umpires who had their hands full. If the battle moved fast, and it usually did, the artillery umpires were quite unable to keep in touch with the situation. The net result was that by about 9 a.m. or 10 a.m. artillery umpires ceased to take any useful part in the battle. In the afternoon there were usually one or more small staged attacks or counter-attacks. If an artillery umpire happened to be at the conference preceding such an operation he

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was usually able to do some useful work, since the frontage and objective were usually limited, and he had only to deal with one or two infantry units.

The writer suggests one important conclusion from this, and that is that an artillery umpire is not really an umpire at all and should not be asked to attempt to umpire. The umpires who actually issue decisions affecting the battle are the infantry umpires. The artillery umpire is really a collector and transmitter of artillery intelligence, which by some means must reach two destinations, one being the infantry umpires and the other being the chief umpire and the Directing Staff. If this be accepted in principle let us consider how these two functions of collection and transmission should be carried out.

A forward artillery umpire report centre, *common to both sides*, is suggested. If this were situated roughly between the two opposing forces and moved on a pre-arranged route it should be readily accessible to the artillery umpires of each side. All artillery umpires would regard this as their intelligence centre. They would transmit to it all their information, including fire plans, movements of batteries, O.P. areas, and tactical information generally. The centre would also receive from the various headquarters all operation orders which affected the artillery situation. From the information available an artillery picture would be compiled by the artillery umpire report centre at intervals throughout the operations. These pictures would be sent out in writing to the infantry umpires, who would thus receive at more or less regular intervals general pictures of the whole artillery situation as it affected them. This would serve as a guide, no more, in their picture painting to their infantry. The artillery information which they would expect to receive by this means would include O.P. areas occupied by both sides, the density of fire which might be expected on major infantry movements, pre-arranged concentrations and barrages, and gassed areas. Infantry umpires would in addition have access—in the normal course—to orders issued by troops with which they themselves were working and so would be in a position to judge whether the artillery support of their own troops was sufficient.

A pre-arranged system of communication is essential for all umpiring. An air-line artery reserved for the umpire system

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running right through the area of operations is required. Lateral lines with one or more sub-centres moving parallel to the main centre will also usually be necessary. The sub-centres would be merely transmission offices and would not compile "pictures." Air lines should be used in preference to cables as not only are they less liable to be cut but they afford a useful guide to umpires and particularly orderlies as to the whereabouts of report centres. Mounted orderlies and motor-cyclists would be required to work from the centre or sub-centres to umpires. These must be organized and controlled by the central umpire organization, and should not be appendages of individual artillery umpires. In a word, an umpire signal service is required.

Anti-aircraft and counter-battery umpiring could also be controlled by the artillery report centre, which would collect information from R.A.F., medium, and anti-aircraft battery umpires. In these cases, however, the dissemination of information in the shape of "pictures" would not be necessary but "decisions" would be required for early transmission to those concerned.

It will be seen that an artillery report centre with its signals will absorb a considerable number of personnel. It will require adequate transport and office equipment, and above all must be staffed by experienced officers. All artillery umpires should be provided with motor transport of some sort. The distances to be covered by them are beyond the capacity of horseflesh unaided. A combination of horse and car works well. These requirements may present difficulty in provision, but it is for consideration whether an effort to furnish a somewhat more elaborate artillery umpire organization than provided at present, would not be well worth while.

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THE INFLUENCE OF THE CONSTANT TACTICAL FACTOR IN THE DEVELOPMENT OF WAR.

By Colonel J. F. C. Fuller, C.B.E., D.S.O.

The Law of Military Development.

THERE can be no doubt that the 19th century witnessed a large increase in the size of military forces; also there can be no doubt that this present century is witnessing the development of tactical force by the application of mechanical and scientific invention; yet these facts in themselves prove little as regards the future of war, unless we can establish a guiding law, or principle, which will govern all military development and organization, and consequently modify and change the operations of war.

It is known that man is influenced by his surroundings, and that should he consciously fail to adapt himself to them, unconsciously he will be adapted by them; this knowledge is generalized in the law of evolution, which simply means that those who adapt themselves the more perfectly to intellectual, moral and physical changes become the fittest to survive. In the life history of military organizations, which are corporate entities, it is the same: civilization is environment, and armies must adapt themselves to its changing phases in order to remain fitted for war.

When civilization largely depended upon brigandage in place of commerce, as it did in the early medieval ages, and when roads were few and generally unfit for wheeled traffic, military power was founded on mounted troops. When this epoch was succeeded by a more stable agricultural one, infantry became the predominant arm; and to-day, because manufacture has become the staple industry of all great countries, and because it is based on science and invention—coal, steam, oil and electricity—it follows that the present infantry cycle will gradually be replaced by what may be called a "mechanical" or "mechanized" one; for it is inconceivable, as long as armies are required by civilized nations, that the existing state of military organization will be maintained. Its evolution may be slow, nevertheless it is certain.

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From this law may be deduced a principle which I will call the constant tactical factor, it is this: Every improvement in weapon-power has aimed at lessening the danger on one side by increasing it on the other; consequently every improvement in weapons has eventually been met by a counter-improvement which has rendered the improvement obsolete; the evolutionary pendulum of weapon-power, slowly or rapidly, swinging from the offensive to the protective and back again in harmony with the speed of civil progress; each swing in a measurable degree eliminating danger.[1] Thus in the days of the stone age, when progress stood almost at a standstill, weapon development was proportionately slow, and may be said to have been always up to date; to-day conditions are diametrically reversed, civil progress being so intense that there is not only a danger but a certainty that no army can in the full sense be kept up to date. This means that in war time evolution will be extremely rapid, and consequently that the army, which is mentally the better prepared to meet tactical changes, will possess an enormous advantage over all others. This point is of such vital importance, that in this paper I intend to keep well ahead of immediate probabilities, and in place of entering upon detail, which may be considered even revolutionary at the present moment, will restrict my speculations to general tendencies, and from these attempt to elaborate what may be called epochal changes—changes which will influence the organization of armies and the operations of war in their larger aspects.

Turning now, for a moment, to the 19th century, a somewhat astonishing foreshadowing of the future may be observed. A hundred years ago the armies and navies of all civilized nations were much as they had been one hundred years before this date; fifty years later—that is at the time of the Russo-Turkish War, they are totally different, so different that one battleship of 1878 would have destroyed a whole fleet at Navarino in 1827; or a single division of the same date the entire army which took part in the siege of Silistria in 1829. To advance yet another fifty years; a present-day battleship, or a present-day division, would be incomprehensible to Ibrahim Pasha and General Diebitsch were it possible to raise

[1] The most dangerous form of war is the primitive hand-to-hand combat, which in classical times was generally followed by the slaughter of the defeated side.

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these men from their graves. From this it would appear that no rational thought regarding the future is impossible, so long as it is governed by the law of military development and it follows the path of the tactical constant.

These stupendous changes were effected by the first industrial revolution—steam-power—which totally transformed naval warfare, and immensely enhanced the power of existing armies, but which did not radically change the general form of their tactics, because their motive power remained muscular. To-day we are in the middle of the second industrial revolution—oil and electrical power—a revolution which we know is changing the motive power of armies, consequently it should be possible to extract from the influence of steam-power on navies, certain general results which are likely to find their counterparts in land warfare when armies cease to be marching organizations.

Naval tactics have passed through three phases, namely, (i) boarding and ramming; (ii) bombardment with intent to board, and (iii) bombardment with the intent to sink at an ever-increasing range. The first applies to galley fighting, and the last to present-day fighting, the intermediate period being covered by naval warfare between about 1550 and 1850. The change over from the second to the third of these phases has had an extraordinary influence, not only on naval operations, but on the relationship of naval warfare to civilization. The mechanization of the warship, if I may use such a term, has resulted in a definite restriction of warfare at sea. Piracy, or small wars at sea, so prevalent in sailing-ship days and universal in the age of the galley, has almost entirely disappeared, and battle fleets have become so costly that no small maritime power can possibly compete with the greater ones. The time is rapidly approaching, if it has not already arrived, when, with the exception of the British Empire, the United States of America and Japan, a naval war will become impossible, or so insignificant an implement of policy as to be of negligible value. Even if France and Italy are added to this list, naval warfare is restricted to five nations.

Turning from the naval to the military aspect of war organization, is it not probable that the mechanization of armies will follow a somewhat similar evolutionary path? Ramming was charging;

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boarding was literally infantry fighting at close quarters, and bombardment with the intent to board may be compared to land attacks to-day. Ramming, or cavalry shock action, has all but disappeared, and under cover of gun fire the infantry advance to the assault. Is it not, therefore, more than probable that at no distant date the third phase in the evolution of naval tactics will find its counterpart on land, that is—the assault will disappear, and battles will become artillery duels at ever-increasing ranges?

The most potent factor in naval evolution was of course steam-power; equally, so, I believe, will oil, or petrol power, prove itself to be the most potent factor in military evolution. Even before the days of the steam-ship, the wooden battleship was doomed by the introduction of the explosive shell, similarly before the days of petrol-driven machines, the infantry soldier was doomed by the rifle bullet, and still more so to-day by the machine-gun bullet. The shell-gun at sea necessitated the introduction of armour, and steam-power rendered the carriage of armour possible. The rifle-bullet had an identical influence on land warfare, and prior to the petrol age protection against it was more and more sought through earth armour, or entrenchments. In the American Civil War trenches abounded; in 1866 and 1870 they were little used, because the Austrian and French commands were so indifferent, that within a few weeks of the outbreak of these war their armies were swept up in the mobile and ably handled Prussian net. Yet it is of interest to remember that no single frontal attack of importance made by either side in 1870 was successful; and that at St. Privat, in the frontal attack attempted by the Prussian Guard, 6000 men fell in ten minutes. In 1878 entrenchments re-appear; in 1900 they take the form of block-house lines; in 1904 they abound, and before 1914 has closed they dominate every battlefield.

The crucial tactical problem of 1914 was to discover a mobile counter-agent to the bullet. Obviously this agent was bullet-proof armour, and as the soldier could not carry it a petrol driven machine was constructed to carry it for him. The idea of the tank was but the idea of the *Merrimac* applied to land warfare. After the battle of Hampton Roads the London *Times* said: "Whereas we had available for immediate purposes one hundred and forty-nine first-class war ships, we have now two, these two being the

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Warrior and her sister *Ironside*. There is not now a ship in the English navy, apart from these two, that it would not be madness to trust to an engagement with that little *Monitor*";[1] and Sir John Hay added: "The man who goes into action in a wooden ship is a fool, and the man who sends him there is a villain".[2]

Obviously there are many differences in sea and land fighting: nevertheless, I am of opinion that one day it will be recognized that September 15, 1916, the day when tanks first took the field, was as important a date in land warfare as was March 8, 1862, in naval warfare—the day the *Monitor* met the *Merrimac*.

THE CONSTANT TACTICAL FACTOR.

In the history of the evolution of military organization, the World War of 1914-1918 bears a close relationship to the American Civil war of 1861-65, and for identical reasons. The forty-six years which separated 1815 from 1861 were years of enormous scientific and industrial development, and so also were the forty-nine years which linked 1865 to 1914. The first period strongly influenced the tactics of the former of these two wars, and the second—the tactics of the latter. The general use of the rifle and the rifled gun following the path of the tactical constant resulted in the Civil War being largely an entrenched war; and the general use of the machine gun and of quick-firing artillery had an identical influence on the nature of the World War. In the former the railway made itself fully felt, and in the latter the lorry; in the one the electric telegraph increased the radius of command, as did wireless telegraphy in the other; in both sea power based on steam was the predominant factor in the attrition which undermined the fighting strength of the industrially weaker side.

I mention these facts because they show how intimately modern warfare, which dates from about 1850, is influenced by science and industry, and if for a moment the reader will pause and consider why each military invention was adopted, he will find that the reason is directly traceable to the tactical constant. In other words: each belligerent in turn has attempted to eliminate the danger threatening him, either by directly countering it, or by increasing it to the detriment of his opponent. Once this is realized, a tactical

[1] Quoted from *Decisive Battles since Waterloo*, T. W. Knox, p. 228.
[2] *The Evolution of Naval Armaments*, F. L. Robertson, p. 263.

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clairvoyance can be cultivated, and mistakes which otherwise become inevitable may in the greater part be eliminated. Thus, whilst in the American Civil War ironclad ships were built mainly to ram each other, from 1865 onwards, for at least ten years, millions of pounds were squandered by all maritime powers in attempting to develop this idea; when, had the tactical constant been understood, its fallacy would have at once become apparent; for the counter-agent to armour was the gun, and by hypothetically increasing its power, and equating this hypothesis with the limitations of armour, a fairly clear vision of future naval warfare might have been attained.

Strange to relate, soldiers fell into a similar error in 1919. As in 1862-1865, the original ironclads were built to ram their like in order to free the rivers and seas for the movement of normal steam and sailing ships; so in 1916-1918, the original tanks were invented to ram the enemy's earth armour, that is to punch a hole through his defences so that the infantry—the normal fighting troops—might attain freedom of movement. In both cases, the underlying tactical idea was the direct assault. In the former, as I have just shown, it eventually proved fallacious, and that this was unnecessary because it was possible to elaborate a hypothesis which would have shown that this must inevitably be the case. The possibilities in the use of the steam-driven naval gun rendered the assault at sea more and more unlikely; and equally so am I of opinion, that the possibilities underlying the petrol driven field gun will eventually render the direct assault on land less and less likely, until it becomes the exception and not the rule.

To-day, if we turn to any of our training manuals we shall find, that the bulk of their tactics is focussed on the assault. It is the assault (ramming) which is the aim of the attack, and the counter-aim of the defence. Artillery and tanks are means of preparing the infantry assault, and as the assault presupposes an assaultable target, the attack automatically becomes a frontal one. In order to protect infantry against tank ramming, they are to be provided with powerful anti-tank weapons, not intended to facilitate the forward movement of their supporting tanks, but to frustrate hostile tanks from attacking them, and so maintain muscular forward movement.

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In my opinion, this idea, which curiously enough pivots on the bayonet, the most primitive weapon now used, does not follow the path of the tactical constant, because the closer an attacker approaches an enemy's *front* the greater becomes the danger. Accepting the constant as an axiom, and not as a mere postulate of war, it follows that in order to reduce danger another tactical idea must be adopted; and if it is not consciously adopted, it will slowly adapt itself to military thought through the costly process of trial and error. What then is the alternative to the assault? It is an old and well-known manœuvre.

In the days when cavalry were a powerful arm, the most economical method of using infantry was to hold an enemy and not to assault him; and once the enemy was held, to manœuvre the cavalry round his flanks and attack him in flank, or better still in *rear*—that is at the point at which the least danger is likely to be met. Holding presupposes a continual threat to assault, consequently it is a frontal action, its aim being not the immediate overthrow of the enemy, but the drawing in of his reserves in order to immobilize him, and so prevent him from detaching troops to beat back a flank attack. For example—at the battle of Ligny (1815) Napoleon attacked Blücher in order to compel Blücher to attack him, and so exhaust his reserves. Once his reserves were exhausted, he directed d'Erlon's column to move round Blücher's right flank and strike him in rear. It was only because this movement miscarried that he ordered the assault on the Prussian centre. At sea to-day it is the same, the destroyer flotillas are the holding force, and the battle squadrons the turning force. To hold and to turn, and not necessarily to overthrow by direct attack, is, in my opinion, *the* tactical idea of to-morrow.

There is still another justification for this statement. At a battle like the battle of Cambrai (1917), it was imperative that tanks should assault; for the battlefield was flanked by canals, the bulk of the troops were infantry, and the tanks themselves had an average speed of only four miles the hour. In the middle of 1918, when a proposal was made to build a machine which could develop a maximum speed of twenty miles the hour, not only was the proposer considered touched in the head, but the main criticism against such a tank was that it would not be able to co-operate

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with the infantry as it would run away from them. Nevertheless, the factor of mobility, always the most important element in the tactical constant—because mobility means energy, and energy means increased carrying power as well as moving power, and consequently increased protection and increased offensive power—has been so vastly augmented, that, in 1928, ten years after the above-mentioned individual was considered mad, a tank attained a maximum speed of forty-nine miles the hour, and what is still more important an average speed over a ninety miles road course of thirty miles the hour. For such machines closely to co-operate with infantry must surely appear ludicrous, as ludicrous as it would be were thirty-five knot destroyers ordered to support the attack of a fleet of wooden battleships. The conditions which prevailed at the battle of Cambrai are dead, they should not, therefore, be copied.

Again there is another justification: we, as a nation, may not be imaginative, but we do possess an undoubted fund of common-sense. We heartily dislike prophets, because we are commercially minded, and are suspicious when we are offered a pig in a poke. Once let the animal out of the bag, and if we like the look of it we buy it, even at a high price. Since 1918, the most important event in the mechanization of the army, has been, not the vast improvement in the tank, but the introduction of the six-wheeled lorry. In spite of our supposed obsession for the horse (really a very superficial one, for only a very small percentage of the population takes any interest in this animal) we at once saw in the six-wheeled lorry, and its tactical cousin the six-wheeled armoured car, an economical means of transport and reconnaissance. Soon the whole of the vehicles in the army will be motor driven, of this there can be no shadow of doubt; and once they are, it is only a matter of time when the bulk of the fighting arms will be compelled to follow suit. Even to-day, we see this change taking form, armoured cars are beginning to eat up cavalry, and armoured machine gun carriers have last year begun to eat up infantry. Though we dislike prophets, who must of necessity be revolutionaries, they are useful in stimulating our thoughts; but, all said and done, our soundest foundation lies in our cautious commercial common sense, which at no very distant date, and here I rank myself with the prophets, will fully accept mechanization, because it pays.

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What does this mean? Does it mean that the whole of our land forces are going to take to tracks, wheels and armour? No, for even at sea this has not taken place, and curiously enough, if I am right in comparing destroyers with infantry, especially infantry equipped with anti-tank weapons, just as destroyers are equipped with torpedoes—special anti-battleship weapons—it is probable that the infantry of the future will be as unarmoured as the destroyers of to-day. There are, however, three factors before which the tactical constant has always temporarily had to bow, though in the end they bow to it: these are money, politics and topography.

If it is thought that mechanized armies are going to prove cheap instruments of war, then a grave mistake will be made. A battleship of to-day costs about £5,000,000, that is the total yearly cost of our navy in the eighteen-forties—this fact should awaken us to financial reality, to which I shall return later on. Politics definitely demand of every national army a two-fold duty: namely, to maintain law and order within the realm, and to protect the nation against foreign invasion. To such nations as cannot afford mechanized armies the second duty will disappear, and even with nations which can, it is unlikely that the first duty will demand mechanized troops; for example—no one in their senses would suggest that the Admiralty should maintain a fleet of battleships to prevent smuggling. The third factor needs special consideration.

It is rightly stated to-day, but more generally by those who are not fully convinced of the value of mechanization, that whatever troops are used, ground, that is topography, is the deciding tactical factor in war. Further, that there are large areas of the world totally unsuited to the movement of cross-country machines. Not only are whole theatres of war, like the North West Frontier of India tactically infantry areas, but portions of most other theatres, such as the Vosges and the Ardennes in north-eastern France are more suited to infantry than to tank action. This is undoubtedly the case to-day, consequently complete mechanization would not fit the strategical and tactical conditions which confront armies. This being so, armies in the immediate future will have to include two categories of troops: those better suited to fight on the plains—armoured troops, and those capable of fighting in the mountains—light infantry. This is the situation as it faces us at present.

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The Restriction of War.

Accepting as our premises the dual organization of fighting force, namely, mechanized troops and infantry, its obvious defect is at once apparent, namely, that in some wars mechanized troops will be of little use, whilst in others, infantry, as combatant troops, are likely to be an actual encumbrance. There is nothing new in this situation, for we have only to go back to the eighteenth century to find that the troops of the line were so unsuitable for mountain, forest and partisan warfare, that the declaration of each war was at once followed by the enlistment of large numbers of irregular troops—light infantry, light horse, sharpshooters, etc. Consequently, I am of opinion, that if small wars, which are really wars against non-industrialized nations, are excluded, minor operations of war, such as clearing an enemy out of woods and broken ground, unsuited to the movement of mechanized arms, need not perturb us. Throughout military history, no army has been prepared or organized in peace time to meet every type of war; instead armies have been, and are still, organized and equipped to meet only the most formidable type.

In our own case we cannot, however, at present exclude the problem of small wars; but is not this problem excluding itself? For instance, if we examine the situation which to-day faces us on the North West Frontier of India, is it not rapidly being solved by the pressure of industrialization? The road, and not the bayonet, is silently and surely conquering the frontier. The road means trade, trade means civilization, and civilization means a restriction of the warlike spirit which is the offspring of uncivilized surroundings. Failing a world cataclysm, such as universal Bolshevism, one thing is certain, namely, that civilization will conquer uncivilized areas, not because this conquest is a military but an economic necessity.

The same compulsion of circumstances applies to all non-industrialized countries, such as Afghanistan, Persia and China. The late King of Afghanistan having lost his throne through attempting to civilize his country, should not alarm us: for the mere fact that he made such an attempt, and not because it failed, shows that progress is percolating through the East. In China it is the same, for the revolt against Westernization is not a revolt

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against industrilization, but a revolt to remove it from Western exploitation. The coal-power of China is known to be enormous, and once law and order are established, and native resources developed, China will become industrialized, and in consequence her main fighting forces will in time become mechanized.

The same evolution applies to most other at present non-industrialized nations; and such as cannot become industrialized, or are too small to develop sufficient wealth from their industries, and consequently too poor to afford mechanized armies will maintain their land forces on a militia footing, that is, purely for the maintenance of internal tranquillity, and whatever money the more virile of these nations can afford for frontier protection is likely to be spent on fortifications and aircraft. Aircraft, as they can avoid hostile armies and fleets, will prove a useful reinforcement for such of the greater powers who may come to their assistance. The same argument applies to small maritime nations and the submarine in naval defence.

Thus we see that the conclusion which we are faced by, namely, two forms of war—great and small—is likely to be a temporary one. That, in place, wars in barbarous regions and between the smaller civilized nations are likely to become less and less frequent, until finally they are altogether restricted, as piracy at sea has already been. This leaves us with one problem—the great war, and one military organization, namely, an army which can adequately take part in such a conflict.

Being left with this single war problem, I will examine it in some detail.

First of all it must be accepted that a great war is only possible between two or more great nations; secondly, that as the whole world is economically becoming more and more interdependent, if wars are to continue it is to the advantage of every nation that their duration should be brief. Here we are presented with two important strategical factors; the one is that great military operations will take place in highly populated and developed areas, and that consequently great battles in mountainous and forest country are unlikely; the other is that neutral powers will from the very opening of hostilities bring pressure to bear to terminate the war, this pressure being expressed through public opinion and exercised through economic restrictions.

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As regards the first of these two probabilities, it should be remembered that nearly all the great decisive battles of the past have been fought in open country, the reason being that in such areas communications abound, and the areas themselves being generally highly developed offer economic targets to the attacker. Mountain and forest warfare have always constituted subsidiary operations of an extremely difficult nature, because mountainous and wooded districts favour the defence. In the future, the difficulties hitherto patent to these areas are likely to be greatly reduced, because mechanized armies will be able to avoid them, and by overrunning the rich plain lands, and by attacking industrial and political centres they will bring such pressure to bear, that the war is likely to be terminated before their garrisons can make their influence felt. It follows, therefore, that the nation which can put into the field, not necessarily the largest but the most powerful mechanized army, and which can from the moment hostilities are declared maintain forward movement, need pay little attention to areas unsuited to mechanized arms which lie within the enemy's frontier.

If money were unlimited, then the greatest industrial nation, supposing it to be imbued with a militarist spirit, such as obsessed the German Empire before the outbreak of the World War, would as far as land power is concerned have the world at its feet; for it must be realized that military movement will be so rapid that one or other of the belligerents will be overrun and disarmed before neutral powers can come to the support of either. If, in 1914, Germany had been able to overrun France in three weeks, the neutral world and the allies of France could have brought little pressure to bear on Germany.

Money, however, is never unlimited, consequently we must now hark back to the financial factor.

Mechanization, in my opinion, will eventually prove extremely costly, possibly as costly as the mechanization of naval power has proved. To-day it may be possible to produce an efficient light tank for £5000, but when international competition in tanks begins, improvement will follow improvement, and the price of machines will consequently soar. No nation is likely to be in the position to build and maintain more than a comparatively small mechanized

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army, for improvements in construction will be so rapid that each new batch of machines produced will be, as is the case in naval construction, in some respects obsolete the moment the machines are "launched". Further still, the cost of fighting machines will be only one item in the general cost. At sea, our navy would be next to useless if it were not that it is based on an elaborate network of coaling stations, oil depots, defended harbours and coastal fortresses. The same will have to be constructed on land for mechanized armies, and as they cannot be built in potential enemy countries, they will be dotted here and there within the national frontiers, forming pivots of manœuvre and protected centres for refuelling which will prove of enormous value in war.

From these considerations the following deductions may be made: The tendency in military evolution towards increased mobility, which is becoming paramount, will find its reaction in attempts to defeat this mobility by means of permanent and field fortifications. This reaction logically follows the constant tactical factor, for protective defensive power is the answer to protected offensive power. Whilst armoured cross-country machines aim at developing mobility through armour, anti-tank defences will strive to destroy the protection armour affords by gun fire, and simultaneously provide a defensive strategical area which will constitute a powerful base of operations for friendly mechanized forces. The cost of the defence will react on the cost of the offence; consequently mechanized armies will be comparatively small, and the smaller they are the more valuable they will become. Normally they will not seek battle in a hostile defended area, rather they will attempt to entice their enemy's mechanized troops into their own defended area. In any case they will not attempt to rush a defended area, the fortifications of which will probably consist of a large number of Martello towers, or small anti-tank works sunk in uncrossable moats and protected by fields of land mines. These works, like medieval castle, will protect all the main avenues of approach, and will link up topographical obstacles, such as mountains, rivers and woods, supplemented by plantations and inundations.

If these general deductions are in any way correct, then it will be seen that besides mechanized forces, large numbers of garrison troops will be required to man the defended areas, to occupy the

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hostile ones once they have been overrun, and to assist in their reduction. Thus, from a single conception of military force, which we arrived at on account of the probable disappearance of small wars and the unprofitable nature of mountain warfare, we have returned to the dual conception, namely, a mechanized army supported by a second line army, composed not of infantry trained to attack, but of foot soldiers trained to defend—partly engineers and partly anti-tank gunners. Finally we come to this somewhat perplexing conclusion: As the defensive gains on the offensive, as it always has after some new offensive weapon has been invented, and eventually "bunkers" this weapon until a still more powerful one replaces it, military operations will become slower and slower, until battles between mechanized armies are likely to grow as static as they were between the enormous muscular armies of the World War.

The Elimination of War.

Should mobile armour be eventually checkmated by static armour, for this is the situation we have now arrived at, seeing that air power cannot be so checked, it would appear that a possible solution to the above stalemate is to be found in the aeroplane.

This is the solution put forward by most Air Forces, not as the answer of a problematical difficulty which may face us fifty years hence, but of the actual difficulty which faces us to-day. Their opinion is as follows: All military power is finally dependent on the civil will. It is the nation and not its army which makes war, consequently as the movement of air forces cannot to any great extent be restricted by armies and navies, the civil population can now be directly attacked and terrorized into submission. This argument is based on the experiences of the World War, which showed the enormous power of aircraft to terrorize capital cities, and to impede work in industrial areas.

It is true that in the World War terrorization of the civil will was possible, and that had the war continued the attack on the civil will might have proved fully effective; but, when this argument is put forward, it is frequently forgotten that its effectiveness mainly depended on the static nature of the war. Fronts being entrenched, the whole of the ground organization of the respective

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air forces behind the entrenched fronts was immune from all forms of attack except that by aircraft.

Now, if I am right in supposing that we are to-day entering a mobile period of war, then this static condition will no longer hold good. True, aircraft, when in the air, will be almost as little affected by mechanized armies as by existing ones, which will closely resemble those of 1914-1918; but aircraft on the ground, and all that aircraft require—workshops, depots, manufactories, etc., will be at the mercy of hostile armoured machines; further still, unless these machines are halted, the civil will can be even more effectively attacked by tanks and armoured cars than by airship and aeroplane. An unopposed mechanized army could easily overrun France or Germany in three or four days, and not only terrorize the civil population but occupy their political and industrial centres, which is a far more effective way of enforcing peace than by pure terror and destruction. Obviously, therefore, they will be opposed, and as present-day armies will not be able to halt them, they will be opposed by their like, and this will mean that it is unlikely that any nation will be in a position to maintain so powerful an air force that it can afford to support its mechanized army and simultaneously launch hundreds of machines at its enemy's cities, for large numbers will be required if this form of attack is to take full and rapid effect. Just as the cost of our navy limits the size of our army, so will the cost of continental armies seriously limit the size of their air forces in the future.

There is still another reason which supports this argument, and an equally potent one. Because the civil will can so easily be struck has already given rise to international legislation prohibiting such attacks. Though such restrictions of war are a frail protection, they undoubtedly do create a definite sentiment against air attacks, which at the opening of a great war, when neutral opinion is still in the balance, will have a marked influence on the behaviour of the belligerents. So much so is this likely to be the case, that I much doubt whether, during the earlier period of another war, any nation will risk bombing its enemy's industrial centres and cities for fear of being branded an international criminal. We may conclude, therefore, that, because aircraft can attack the civil will, fear of such attacks will definitely restrict the outbreak of war: and

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because such attacks are contrary to international agreement, when war is declared, belligerents will hesitate to indulge in them until excuses can be found to justify them.

As a great war progresses, it is almost certain, seeing how interdependent the world is becoming economically, that one nation after another will be sucked into the vortex of war, as happened in the last war. Neutral opinion as the arbiter of the rules and laws of war will vanish, and as no moral restraint will be left, civil centres will undoubtedly be bombed if only to bring the war to an end. Whether lethal gases, or vesicant chemicals, or high explosives are used is immaterial, but what is material is that nations will make the most strenuous efforts to protect themselves, and as these aerial bombardments are not likely to take place until the war is well advanced, and until the stalemate between the opposing mechanized armies provides an excuse for this form of attack, they may find ample time wherein to protect themselves against them.

Here we are faced by yet another dilemma, namely: If world opinion should restrict air attack on cities, until all the greater powers have been sucked into the war, air defence may become strong enough to frustrate air attack. Are we destined then to be confronted by a complete stalemate, which can lead to peace only through sheer exhaustion? I do not think so, if it is realized that the secret of future air power lies in wireless control, that is, in electrical science. The air must wed the ether if air power is to dominate in war; and when this union is consummated, as I will now show, the offensive may become so powerful and so difficult to counter, that ultimately nations may decide that the game of war is not worth the candle.

To-day should two hundred aeroplanes be despatched to bomb a city, each would be controlled by at least two men—here is the weak link. To hit the city they must fly over it; in other words assault it. The city may be so strongly protected by anti-aircraft defences that the weak link will snap. The human element, the men in the machines, will not face the danger, any more than the infantryman to-day will face the machine-gun bullets of the defences. Why assault? Why not in place hark back to our old friend the tactical constant, which whispers—"eliminate the danger." Why not send forward over that city two hundred un-

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manned and partially armoured aeroplanes wirelessly controlled by, I will suppose, ten occupied ones flying at a distance from them, or at a high altitude above them? Each of these two hundred machines would be nothing more than a flying projectile—a true aerial torpedo—which will explode on impact with the ground, or be exploded by a wireless wave released by the airman directing them. Here the picture of the defence changes, for in place of shooting down human beings, the defender with his guns will bring down upon his city vast nerveless projectiles—in place of protecting the city each hit scored will throw it into panic.

What is the answer to this form of attack? Frankly I do not know. There may be an answer, and if wars are to continue there certainly will be an answer; but not one which will place all the great cities underground, for this is really unthinkable. Personally, I am inclined to hold the opinion, that anyhow for a long period, that is, as long as our present civilization lasts, wars will at some time in the future, and not a very distant future, be relegated to the dustheap of things which have failed, and which have outgrown their utility. Whilst in mechanical and chemical science I see possible fertilizers of war, in electrical science I see its possible end; for if an electrical wave can direct an unmanned aeroplane, as we know it can, it can direct and control an unmanned gun, or tank, or any other weapon static or mobile. The result of being able to move weapons, projectiles, etc., at a distance, and yet continue to direct their course, cuts out, not completely, but very largely the weak link in all past warfare—the human element.

For thousands of years man unconsciously has been working towards this end, in other words, willy nilly, he has been compelled by the costly process of trial and error to travel along the path of the tactical constant. The stone axe gave way to the primitive bow because man feared to be struck by the axe, the bow to the musket because man feared the arrow, the musket to the rifle, and so on. Obviously this progress has not been consistent, because it has depended upon the caprices of civilization, and man is far from being a logical animal. Now, however, the secret of weapon evolution, one of the many forms of general evolution, is known, consequently it is almost a certainty that it will be more and more closely followed; and once it is followed, the logical process of the

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elimination of danger on the battlefield will, so it seems to me, proceed to its logical end—the elimination of war itself.

SUMMARY AND CONCLUSIONS.

Looking back on the period examined, that is from the opening of the 19th century until to-day, there can be no shadow of doubt, as far as this period is concerned, that the law of military development has been the interdependence of the progress of war and the progress of civilization. This being so, I think it may be inferred that this law will continue to govern the evolution of military organization in the future.

Though it is not possible to say what discoveries will be made in civil science before the present century closes, the constant tactical factor in war permits us to forecast that whatever these discoveries are, when they are applied to military organization they will tend towards the elimination of danger in military operations.

From this law and this factor, starting with armies as they exist to-day, we can establish a theory, namely, that once mobility is freely developed from protected offensive power, a reaction to this condition will at once set in, and will take the form of stability developed from protected defensive power. A stalemate will then follow, when once again mobility will be developed in order to overthrow stability.

This theory I have attempted to apply to the future of war, using as my medium present-day knowledge, and not attempting to describe what may happen if some purely speculative source of energy were to be discovered; such as atomic energy. It will be seen therefore, that I have kept well within the bounds of rational thought.

Starting with the industrial revolution, which heralded in modern warfare, we may divide this epoch of war into three periods, namely, the periods of coal power, oil power and electrical power. The first entirely changed the organization of navies, vastly increasing the size of armies, and so potently enhanced their weapon power that ultimately the defensive became the stronger form of war. During this period naval small wars were eliminated, naval great wars restricted, and through the economic interdependence

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of nations, begotten by steam power, great wars rapidly grew into world wars.

The next period, oil power, is the one which faces us to-day, and which has heralded in mechanized warfare on the land and in the air. During this period military organization is likely to proceed along the following course: administrative organizations will first be mechanized, then tactical organizations will follow suit, and a high degree of strategical mobility will result. This will stimulate the idea of the defence, which by field and permanent fortifications will restrict mobility, and demand an extensive organization of defensive infantry. Ultimately, the defence will once again outbalance the offence, and a stalemate will result. During this period small wars will be eliminated and great wars will be largely restricted.

The third period, electrical power, also faces us to-day, and is still in its infancy. As the wireless wave is in more than one respect beginning to dominate civil life, accepting the law of military development, it will in the future as powerfully influence military life and organization. Urged forward by the tactical constant it will inevitably be applied to weapon-power, with the result that as battlefields become less and less dangerous, the areas behind them will become more and more dangerous. The shifting of danger from the fighting man onto the civilian is likely to cause such a reaction against war that universal peace will be established.

By some it may be considered that a paper such as this one is valueless, because it fails to describe the detail of future military organization and operations, and in place soars into periods which seem so remote as to be altogether intangible. As regards the first point: what is the use, except as concerns the immediate future, of attempting to enter into the details of organization? In my opinion, what is required are a few governing and strictly logical ideas, which will not fashion future organization, but which will instead help us to direct its course.

As to the second point, it is true that the phases of war examined are not likely to be packed into the next few years,[1] but that they

[1] The period immediately following a great war, on account of lack of money and incentive is always militarily a comatose one. Thirty or forty years hence, when nations have recovered from the last war and new interests have been created, it is likely that military competition will once again begin, unless, in the meantime, human nature undergoes a profound change.

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may all find expression before the present century has run its course is, in my opinion, quite possible. When I think of the control room of the *Hood* and the quarter-deck of the *Victory*; the machine-gun and the flint-lock; of wireless telephony and the semaphore slowly wagging its arm from hill to hill; when I carry my mind back only seventy years, and see the electric telegraph, the railway, the rifle and the armoured ship just beginning to emerge from out the laboratories of science and the workshops of industry; and then when I carry my thoughts forward seventy years from to-day, no speculation I have made seems to me impossible. All I have written may take form if my reasoning is logical, for logical speculation is the fulcrum of the lever of invention; and surely it is far more likely that warlike inventions, rather than peaceful sentiments, will one day be able to whisper into the ear of this troubled world—*pax vobiscum*.

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GENERAL SIR JOHN LEFROY, K.C.M.G., C.B., F.R.S.

Colonel Commandant, Royal Artillery.

1817—1890.

BY CHARLES FFOULKES, O.B.E., F.S.A.

THE biographical notices of Sir John Lefroy which have appeared in the Dictionary of National Biography and in the Proceedings of the Royal Artillery Institution (Volume 18), have obviously drawn their material from official sources, for but little is said of his private life or his personal adventures when engaged on official duties. He was a man of varied interests and attainments; soldier, astronomer, scientist, antiquarian and devoted Churchman and Christian. In conjunction with his friend, Capt. Eardley-Wilmot, R.A., under the title of "The Royal Artillery Institution", he revived the "Military Society" which flourished at Woolwich between the years 1771-1780, and became the first Secretary in 1838. He served under nine Secretaries of State in the War Office, and finally became Governor of Bermuda and afterwards of Tasmania, leaving published works on every variety of subject which occupy a whole column in the Dictionary of National Biography.

It is, however, with the more personal details of his life that we are at present concerned, and these are to be found in the autobiography printed for private circulation, which is quoted by permission of General Lefroy's surviving relatives.

There are many interesting details of his life as a cadet at Woolwich, a few of which will suffice as similar stories have been frequently published in memoirs and biographies of other officers. Boys joined the Academy on a Sunday, a custom which was changed at the urgent request of Lefroy's guardian. There was no chaplain and no religious instruction whatever and yet, according to Lefroy, the code of honour among the cadets was high. A cadet would never break arrest, but this compliance with regulations could be effected by "having one toe in the place of confinement". Books, instruments, etc., might be "smouched" or purloined but private property was severely respected. A first year cadet could not carry

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a cane or wear straps to his trousers; in fact sartorially and otherwise the Academy was much the same as most public schools in the early part of the nineteenth century.

Lefroy took part in many ceremonials which included a review at Woolwich in 1835 by William IV at which Queen Adelaide was so exhausted by the long inspections on foot that she finished up at the Rotunda by sitting in a wheelbarrow and refusing to move. He was posted in the Triforium at the Coronation three years later to give the signal when the crown was placed on Queen Victoria's head, the signal being passed on to saluting batteries. This, however, was altered at the last moment in favour of a senior officer and Lefroy, in full uniform was placed on the centre of Westminster Bridge to pass the signal on to the Tower, to the great delight of the crowds from Lambeth and the Old Kent Road.

The first incident of outstanding interest is found in a letter dated Longwood, St. Helena, 17th October 1840. Lefroy had been sent to St. Helena to conduct surveying operations with Lieutenant Wilmot. In the letter referred to, he writes that he was permitted to be present at the ceremony of exhuming the body of Napoleon I, the date being fixed for the 5th of October, twenty-five years to a day since Napoleon landed on the island. Those present included Count Chabot (Chief Commissioner) Marshal Bertrand, General Gourgaud, Las Cases, two French captains, the Abbé Coqueran, and about half a dozen English colonial officers who assembled at the graveside at midnight. Sentries were posted on the hills round, and the work of exhumation was carried out by coloured labourers. The layer of masonry which covered the grave was set in the hardest cement, the stones clamped and leaded together, and nearly five hours were consumed in removing one foot of the covering. The lower part of the grave was entirely formed of cement and after a great deal of strenuous work the slab of the sarcophagus was reached early in the morning.

The watchers took it in turns to rest in a house nearby, where coffee was provided for them, and by ten o'clock the slab was raised. The Abbé in what Lefroy describes as "splendid robes" took his place at the head of the grave, sprinkled holy water and recited the *De Profundis* and other prayers. The instructions given to the officials concerned were so exact that it was considered

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necessary that the coffin should be opened so as to be sure that the body had not been changed, and at this moment all the watchers, excepting the Commissioners, were ordered to leave. Lefroy states that eye-witnesses told him that the features of the Emperor were clearly distinguishable and the dress unimpaired.

The remains in the original coffins were placed in the ebony coffin brought from France, and the whole was enclosed in a sarcophagus of oak weighing 23 hundredweight.

At four in the afternoon the procession started for the harbour. The island militia marched first, then the regulars, then the priest with his assistants preceded by the crucifix, and then the hearse covered with the gorgeous pall which had been specially embroidered in Paris for the occasion. It measured 14ft. 10in. by 10ft., of purple velvet richly embroidered with golden bees, and surmounted by a broad cross of silver and gold lace; the whole being edged with a border of ermine. It is stated that the cost of the embroidery alone was £1000. Lefroy only mentions three pall bearers, Bertrand, Gougaud and Marchand, the coffin being followed through the rain and mire by the Governor, Lieut.-General Middlemore, and "an immense number of French and English officers."

Acting under instructions, guns on the island fired a royal salute of 101 guns, but owing to some difference of opinion the chief naval officer declined to do more than recognize Napoleon as a general, and gave only a salute of 21 guns from his ships. Lefroy then makes an extraordinary statement. He says that at that time, at the end of 1840, the relations of England and France were strained to the utmost degree over the Syrian question, and that declaration of war was daily expected. He states, and this must have been from hearsay, that the French frigate "La Belle Poule", carrying the coffin, cleared for action as soon as she was beyond the three-mile radius, and that H.M.S. "Dolphin" followed at a distance ready for immediate action should occasion arise. This incident is noted with several other interesting details connected with the exhumation by Las Cases ("Mémorial de Ste. Hélène", Vol. II).

After the body of Napoleon had been received in France, many of the Emperor's friends and admirers visited the island and made large collections of minerals, of earth, flowers, leaves, bulbs, and

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even spring water, which they took away as souvenirs. The French gave handsome presents to those who had been concerned in the exhumation, which included a number of commemorative medals, but these seem to have been carelessly distributed.

After this Lefroy's life was mainly concerned with his astronomical and surveying duties until about the year 1854 when he was offered an appointment under the Duke of Newcastle at the War Office, where he worked strenuously for the introduction of rifled artillery, which, however, was not introduced into the Army until after the Crimean War. In 1858 he was sent to the Crimea to report on commissariat, ordnance and hospital stores, and this part of his diary is of interest as it confirms many of the stories which have so long been current about the lack of organization and the terrible privations of the troops during the winter of 1855.

Roadmaking was apparently left severely alone, or carried out with little enthusiasm. In fact, the Duke of Newcastle considered that roadmaking had been overdone, and that the troops should have been used for more important work. Lefroy quotes a story which possibly has appeared elsewhere. The captain of a ship at Balaclava was told to get up steam with all haste to proceed to Constantinople on urgent secret service. When well out to sea the captain asked the staff officer, who had been sent to accompany him, what the service was. He was told that it was to get a cargo of boots with the utmost possible despatch as the army was almost barefoot. To this the captain replied that his ship was full of boots, and that he had been trying for weeks to get somebody at Balaclava to take them off his hands. Lefroy adds on another page that the majority of the boots were all one size.

The Land Transport Corps had only just been formed, and there was a shortage of officers, but subalterns "who might have a taste for this duty" were invited to volunteer. The scandal of "hutting" accommodation is well known. A certain number of huts were sent out for officers, men, and hospitals, but though huts for over 20,000 horses were asked for, none were sent, and when the huts arrived the iron bolts and fittings were frequently omitted. Lefroy considers that it would have been infinitely preferable and far more economical to have sent the timber and had the huts built on the spot.

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Lord Hardinge suggested the use of the Irish jaunting car as a light hospital conveyance, and 200 of these were despatched, all fitted with trays divided into neat square compartments for medicine bottles, surgical necessities and suchlike. When they arrived it was found that no bottles were sent to fit into the trays and that the springs were so week that the seats pressed down on the wheels, and in some instances were cut through. Horses were picketted in the open, and their ration of chopped straw was blown away as soon as it was thrown down to them. This was an expensive luxury as it cost £20 a ton, whereas hay could be provided for £13 a ton, and the locust bean which was highly recommended by some authorities, was not used at all. An urgent demand for horse blankets was sent home in the winter of 1854-55, and 20,000 coloured blankets were sent out, but, as no notification was sent as to the purpose for which they were intended, they remained in store until October 1855, when it was suggested that they might be utilized for horse clothing. It was not until December of the same year that it was discovered that they had been actually sent out for that very purpose.

The difficulties of transport were great, and on one occasion Lord Cardigan received orders to send down cavalry horses to bring up biscuits for the infantry, which was half starved. This was not considered to be a proper function of cavalry, and the result of the order was one dragoon on a horse, leading another horse which carried one bag of biscuits. 3000 sealskin boots were received, and as nobody had been notified of their arrival, they were sent back to Malta where there were also vast stores of blankets and rugs which do not appear to have ever reached their destination. 6500 paillasses and 6000 bolster cases were sent out, but it was discovered that these would require 8000 tons of straw to stuff them.

Lefroy had an interesting experience when he was asked to examine a case of little square tubes with glasses, which were unissued as nobody had the slightest idea for what purpose they were intended. On examination these were found to be the first periscopes which were patented in 1855, and when their importance was realized they became extremely popular, but by that time it was too late to make much use of them.

He states that one cavalry regiment (11th Hussars) wore cherry

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coloured overalls and that there were never more than 300 men. In the store, however, there were 1000 of these garments which do not appear to have been issued.

When some attempt at roadmaking was instituted in August of 1855, 15,000 stone hammers were asked for, but the authorities at home refused to sanction such an unheard-of demand. It was, therefore, necessary to buy 7000 in Constantinople at 4/2 apiece. Eventually when the work was nearly completed the full supply was sent from England to arrive when not wanted. Sand bags which were urgently needed in the Crimea were sent back to Scutari, to the number of 250,000.

The merchant shipping used for transport purposes seems to have been for the most part hired, when it would have been far cheaper to buy the vessel outright, and it was estimated that every invalid sent home cost £300, and that every mule cost £71 in transportation charges.

As in the late war, the general public, though generous to a fault, do not seem to have made any enquiries as to the gifts and comforts urgently required by the men. In the year 1855-56 there was a large store at Balaclava full of these gifts which nobody would accept. Morphia was so costly that it was very seldom used, and yet in the course of his inspection, Lefroy found 84 lbs.

General Lefroy met Florence Nightingale on frequent occasions, and had the highest admiration for her indomitable courage and of her perseverance, and a firm friendship began at Scutari which was continued throughout his lifetime.

It was during his tour of inspection that Lefroy visited the Dardanelles, where he saw the great bronze screw gun which during the present year has been transferred from the Rotunda Museum, Woolwich, to the Tower of London. He began negotiations for obtaining this gun in 1855, and these were continued through ten years, and eventually in 1867 the gun was received at Woolwich.

He also obtained by purchase the valuable collection of 15th century helmets and pieces of armour from the Castle of the Knights of St. John at Rhodes. These pieces have also been transferred to the Tower Armouries during the last two years.

The remainder of his Autobiography and Diaries deal more especially with events of a more intimate nature, but from time to

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time we have interesting notes as to the use of rifled firearms and guns, a subject in which Lefroy was keenly interested. The last part of the book deals with his life as Governor of Tasmania, his return home, his illness and his death.

In reading this account of General Lefroy side by side with the official memoirs above referred to, one cannot but admire his unceasing energy in every one of the varied works which he undertook. Seldom does one find an officer keen in his military duties, who has such many-sided interests. All his papers and printed works show a meticulous care and thoroughness which might well be imitated by students of the present day. On the one subject of the Dardanelles guns alone, he searched out every author who ever mentioned them, he read and quoted minutely historians who dealt with the history of the Orient in all languages, and to this he added his own expert knowledge of artillery, making the whole treatise a most valuable document. His name is very rightly inscribed in the centre pillar of the Rotunda Museum as a memorial to one who was largely responsible for the foundation of the Royal Artillery Institution, which he loved and worked for enthusiastically almost to the day of his death.

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THE 'HONOUR' TITLES OF BATTERIES IN THE ROYAL REGIMENT OF ARTILLERY.

By Major (Bt. Lieut.-Colonel) J. H. Leslie.

(Continued from Vol. lvii, p. 53.)

III.

'WATERLOO.'

THREE Batteries only bear 'honour' titles connected with the battle of Waterloo—18 June, 1815. They are distinguished by the names of the Officers who commanded them in the battle, but it is difficult, even at the present time, to realize that they bear those names, *because* they were 'Waterloo' batteries.

The three Batteries are:—

'G' Battery, Royal Horse Artillery	'Mercer's Troop'.
7th Field Battery	'Sandham's Company'.
27th Heavy Battery	'Lloyd's Company'.

Of these three, 'G' Battery is the only one which has unbroken existence since the battle, as Sandham's Company of the 3rd Battalion, R.A., and Lloyd's Company of the 10th Battalion, were reduced in 1819 and 1817 respectively.

'G' Battery, Royal Horse Artillery.

Alexander Cavalié Mercer was 2nd Captain of 'G' Troop, no Captain having been posted to it in the room of Captain A. S. Frazer, who had been promoted to the rank of Major in December, 1814.

Consequently, as regards the battle of Waterloo, it has usually been known as "Mercer's" Troop.

Mercer's *Journal of the Waterloo campaign*, two volumes, was published in 1870, "written", as his son states in the preface, "in its present form, some forty years ago, from rough notes jotted down every evening after the scenes and events of the day were over".

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The book is interesting but unsatisfactory. It has no maps, no index, and was in no way "edited". In 1927 it was republished—one volume—by Peter Davies, Limited, unedited, uncorrected, and with no map.

Some letters from Mercer—1859 to 1863—to H. M. Leathes, who was a Lieutenant in the Troop, at Waterloo, entitled *Reminiscences of Waterloo*, were privately printed, about 1870, though there is no date given. I have a copy, given to me by the son of H. M. Leathes.

Sandham's Company.

Captain Charles Freeman Sandham commanded a Company of the 3rd Battalion, R.A., at Waterloo. It became Captain Lewis Carmichael's Company in July, 1816, Carmichael, 8th Battalion, exchanging Companies with Sandham. Two Companies of each of the nine Battalions, R.A., were reduced in 1819, Carmichael's Company being one of them.

It has been customary in recent years to refer to this reduced Company as "No. 9" of the 3rd Battalion. As a fact, it could not possibly have *ever been known* as "No. 9", because the numbering of Companies of a battalion was not adopted until 1827, eight years after Carmichael's Company was reduced.

Colonel Francis Duncan in his *History of the Royal Regiment of Artillery*—1st edition, 1872, p. 226—allotted numbers to all the Companies which had been reduced in 1817 and 1819, presumably on the assumption that they *might* have been so numbered if they had continued to exist until 1827, but it cannot be too strongly emphasized, in the interests of historical accuracy, that no authority whatever exists for such numbering. It was a purely fortuitous and fictitious happening. Prior to 1827 Companies in a battalion were known by the name of their Captain.

In 1848[1] a real "9 Company, 3rd Battalion" came into being, which, without any authority, was later embodied in the "List of Changes" as being the fictitious "9/3"—really Carmichael's Company—reformed.

In due course it became 7th Field Battery, but, through oversight, it was not included in Army Order No. 112 of 1901 "to

[1] R.A. General Order of 16 August, 1848.

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perpetuate the memory of distinguished services rendered by certain units of Royal Horse, Field, and Garrison Artillery which have at various times been reduced".

This omission, however, will shortly be rectified, and 7th Field Battery, formed in August, 1848, will be officially recognized as being Carmichael's (formerly Sandham's) Company Re-formed.

LLOYD'S COMPANY.

The 10th Battalion, R.A., was raised in 1808. One of the ten Companies was commanded by Captain William John Lloyd,[1] and was present at Waterloo under his command. He was wounded, and died at Brussels on 29 July, 1815, from the effects of his wounds.

He was succeeded by Captain William Greenshields Power, who remained in command of the Company until the 10th Battalion was reduced in 1817.

It has been customary when writing about this Company to refer to it as "No. 2 Company, 10th Battalion", but, as explained above in the case of the reduced Companies of other Battalions, it could never have borne the designation "No. 2", in that Companies did not receive serial numbers until ten years after it was reduced—1827.

It pleased Colonel Duncan, however, to allot fictitious numbers to all the Companies of the 10th Battalion—see his *History of the R.A.*, 1st edition, 1872, Vol. II, pages 186-8.

Power's Company was thus numbered "2", and when a new 10th Battalion (8 Companies only) was raised in 1846,[2] its No. 2 Company, without any authority, appears to have been looked upon as the revived representative of Power's Company.

In this case, however, official authority to be so considered was given, at a later date, by Army Order No. 112 of 1901, which laid down that "No. 14 Company, Eastern Division, R.A.", formed in 1846 as No. 2 Company, 10th Battalion, R.A., should be considered as the former so-called No. 2 Company, 10th Battalion (i.e. Power's Company), re-formed. This Company, after several changes of designation, became "27th Heavy Battery" in 1927 (Army Order 214 of 1927), which title it still retains.

It would, I think, improve matters and make the reason for

[1] Lloyd of Dan-yr-Allt. See Burke's *Landed Gentry*, 1914, pp. 1171-2.
[2] R.A. General Order of 2 April, 1846.

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granting these 'honour' titles more easily understood in years to come, if the word 'Waterloo' were to be added, so that the titles would read :—

Mercer's Troop—Waterloo.
Sandham's Company—Waterloo.
Lloyd's Company—Waterloo.

We have 'Minden', 'Sanna's Post', and 'Néry' as 'honour' titles. Why not 'Waterloo'?

Other Batteries in the Regiment which are entitled to 'Waterloo' as an honour, are :—

"A" Battery, R.H.A.		(The Chestnut Troop).
"D" ,, ,,	—	the "F" Troop of Waterloo (Captain J. Webber Smith).
"E" ,, ,,	—	(Captain Sir R. W. Gardiner).
"H" ,, ,,	—	"Ramsay's Troop".
"I" ,, ,,	—	"Bull's Troop".
"O" [1] ,, ,,	—	"The Rocket Troop".
"V" [2] ,, ,,	—	the "D" Troop of Waterloo (Captain George Bean).
82nd Field Battery	—	(Captain Charles George Alms's Company, 9th Battalion).
8th Heavy Battery	—	(Captain Thomas Rogers's Company, 3rd Battalion).
9th ,, ,,	—	(Captain Frederick Gordon's Company, 3rd Battalion).[3]
10th ,, ,,	—	(George Wilkes Unett's Company, 3rd Battalion).
12th ,, ,,	—	(Joseph Brome's Company, 3rd Battalion).

[1] Not present at Waterloo, but authorised by Army Order No. 112 of 1901 to be considered as the 1st Rocket Troop, reduced in 1816, re-formed.

[2] Not present at Waterloo, but authorised to consider itself as Reduced in 1816; re-formed as "V", in 1890.

[3] Gordon had not joined the Company, which was commanded by 2nd Captain J. S. Sinclair.

(To be continued.)

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ARTILLERY SUPPORT OF PIQUETS IN MOUNTAIN WARFARE.

By Captain D. McK. Kennelly. 5th Royal Mahrattas.

THE dispositions of a force engaged in mountainous country are different to those of a force engaged in any other type of warfare in one respect: the distribution of a considerable portion of its strength in piquets which are virtually isolated from the main body. This isolation is due to the terrain of the country rather than to the actual distance between piquets and the remainder of the force. A piquet may be only five hundred yards from its supporting troops and yet have to fight the enemy to a finish without receiving any outside help. All who have served with a piquet in action will readily admit this. It is not the fault of the supporting troops—they would help if they could see the enemy, but hillmen are born with an eye for country and will seldom show themselves. The piquet alone will know where the enemy fire is coming from. Supporting troops, especially the gunners, also find it difficult, at a distance, to distinguish between the enemy and our own men and often withhold their fire for this reason. A recognized method for piquetting a hill top when opposition is expected is for the guns to drop a few shells on the objective shortly before the piquet assaults it. This entails a waste of ammunition when the supply is apt to be very limited. Also the enemy know this method and will not take up a position on top of the hill but under cover to some flank. The same applies to the method of dropping a few shells on the position while the piquet is withdrawing from it.

There is only one sure way of overcoming this isolation of piquets: by quick communication between the piquet and its supporting troops. A slow method of communication is useless for three or four minutes usually decides the issue of a fight between a piquet and the enemy. This again is due to the nature of the country. Good cover enables the enemy to strike at close range and unless the piquet can gain superiority of fire in a few minutes the chances are that it will be overwhelmed. If the piquet and the enemy prove to be evenly matched then the

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sooner covering fire of supporting troops is brought to bear on the enemy the better for the piquet and for the whole force.

Quick communication being such an important matter to piquets, it is surprising to find that they have fewer means of communication than troops fighting in open warfare. For good reasons messages by runner are not allowed. Telephone cables are only laid for standing piquets. A battalion detailed for piquetting duty on an average supplies twenty piquets. To lay and roll up the miles of cable required to supply each piquet with a telephone or buzzer would be an impossible task to the small complement of signallers with a battalion. Wireless telegraphy may solve the difficulty in the future but at present it is not a practicable solution. The only remaining means of communication is by visual. Now a battalion would have the greatest difficulty in supplying even ten piquets with pairs of trained signallers. As a result at least half the piquets have no means of signalling except by hand semaphore, in which all ranks are instructed. Neither method is quick enough, nor distinctive enough to catch the eye at a great distance.

The average piquet commander faced with the alternative of gaining his objective under fire or of waiting under cover for artillery support will invariably choose the former course. He knows that it will take him at least a minute to write a clear message stating the position of the enemy. It will take at least five minutes for the signallers (if he has any) to get into touch with and send the message to headquarters. Allowing another three minutes for the issue of orders to the guns, nine minutes have passed before the first shell is fired. This is presuming that the guns are fairly near headquarters which is not always the case. In these nine minutes a hillman can easily travel a mile. It is not therefore very surprising that piquet commanders prefer to go on and risk a few casualties, instead of waiting for artillery fire which may not fall anywhere near the enemy. The gunners are not to blame for this lack of co-operation. It is entirely due to the slow method of communication between the piquet and the guns.

Now each piquet carries an artillery screen, khaki on one side and white on the other. The only uses of this screen are to show the artillery :—

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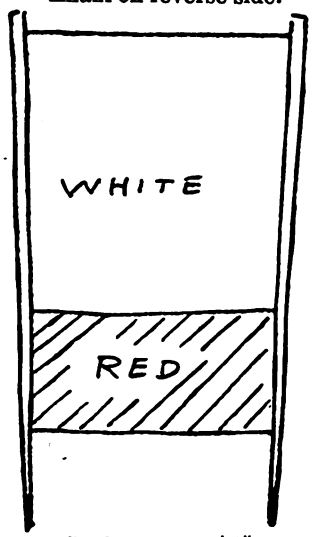
(a) That the piquet is in position.

(b) That the piquet is withdrawing from its position.

The former warns the artillery not to fire, the latter tells them that they may fire if they think fit. But for lack of information the gunners are not always certain that their fire is necessary; if they think it is, they fire on top of the hill, not knowing where the enemy really are. It is suggested that it is possible for a piquet to send a quick and accurate call for support by the clock code method. The artillery screen with some alteration to its shape and colour could be used for this purpose to save the piquet carrying an extra load. (Diagram 1.) The red portion of the screen is added to ensure that there is no mistake as to the direction in which the screen is pointing. In employing the clock code for the description of the target the piquet's objective is twelve o'clock while the artillery screen is the centre of the clock. It is not advisable to use the north point as twelve o'clock in the code because in mountain warfare, even the best piquet commander is liable to lose his sense of direction on the way to his objective. If it is used, all piquet commanders should have compasses.

DIAGRAM 1.
Khaki on reverse side.



Width about 2′ 6″.
Height ,, 4′ 6″.

An example of the occupation of a piquet position is given below to make the method more clear:—

A piquet having approached a point four hundred yards distant from its objective is suddenly fired on by a party of thirty or forty tribesmen who are in a small ravine to their right. The advanced guard of the column is moving along a valley on the left of the piquet. The piquet commander realizes that the fire power of his piquet (two sections) is not sufficient to beat down the enemy's fire, and that half of his men will be knocked out before he reaches his post. He knows that the Lewis guns or guns detailed to support him have no idea of the enemy's position, for he himself can only just discern an enemy head here and there. He decides that artillery support is necessary,

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orders his men to keep under cover while engaging the enemy and then sends back his call for support:—He faces the battery and waves the screen from side to side above the shoulders about six times and closes it (see Diagram 2. Note: screen should be handled closed and only opened when in the correct position for the signal). This is his call for artillery support. He need not wait for an acknowledgment from the battery as he knows that the gunners have detailed someone to watch his progress through field glasses, and he is already in touch with the screen worked by the artillery O.P. He carries straight on with his message. The enemy are directly on his right flank: three o'clock. He holds the screen stationary for a few seconds in line with his left shoulder denoting 3 o'clock (Diagram 3). He judges the enemy are three hundred yards away. He raises the screen three times above his head and the call for support is through in less than twenty seconds. Moreover the gun or guns, which should already be aligned on the piquet's objective, have only to switch a degree or two right, drop, say one hundred yards range to be ready to fire *on the enemy*.

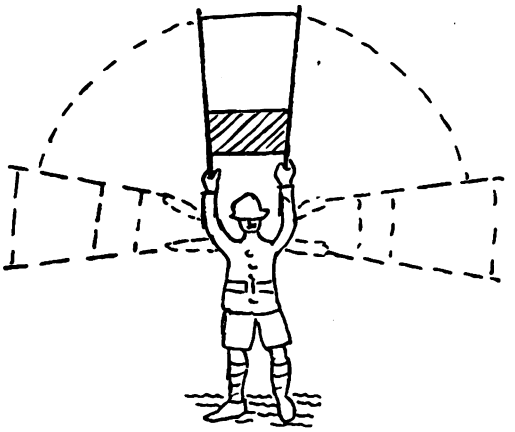

DIAGRAM 2.

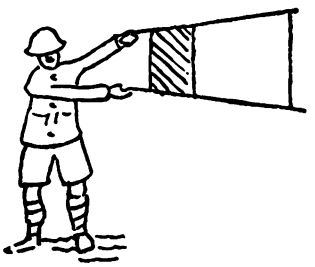

DIAGRAM 3.

The piquet commander now places himself in position to watch the effect of the shells, handing over the working of the screen to an assistant, who remains under cover. He hears the first shell come over but does not see it burst—the gunners are treating this as a "danger shoot." The next shell falls two hundred yards behind and to the right of the enemy. The assistant signals "plus" (screen held straight above the head) then "right" by holding the screen in line with his *left* shoulder. The method is

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easy to remember:—above the head is a shot which has gone over—by the feet one which has fallen short—straight out in line with the left shoulder a shot which has fallen to the right, and vice versa for a shot that has fallen to the left. The direct hit or "O.K." is signalled by placing the screen in front of the body—the cease fire or "wash-out" by waving the screen from side to side below the shoulders. (Diagram 4). In reporting the fall of shells the target becomes the centre of the clock and the screen six o'clock. The observations plus—minus—right—left—are made as simple as possible to avoid the errors likely to occur in using the screen for a complicated system of signalling.

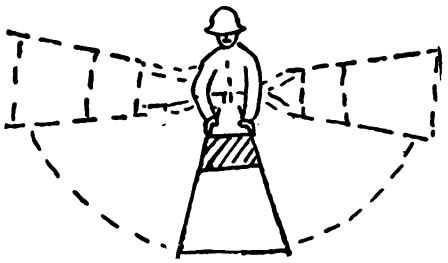

DIAGRAM 4.

The gunners of course have their own clock to work out from the messages received from the piquet commander. The call for support "three o'clock—three hundred yards" will give the gunners a good idea of the position of the target and therefore of the direction in which the piquet observer is facing. If, however, this method does not suit the artillery then the ordinary clock code with the north as twelve o'clock may be used provided *all* piquet commanders have compasses.

In the same way a piquet commander may call for artillery support when the piquet is in position, but the screen must be at least one hundred yards below the position to give the gunners a clock to work on. The piquet commander gives the signals by hand or a small flag, his assistant repeating with the artillery screen.

Artillery support for the withdrawal of a piquet may be prearranged by the piquet commander as in the following example:—A piquet of one platoon on hill "A" (see sketch) is closely engaged with the enemy who are scattered about the reverse slope of the hill. The Lewis gun section is holding spur "B" to cover the withdrawal of the rifle sections. The rearguard flag has just come in sight so in about ten minutes' time the piquet will receive the signal to withdraw. The piquet commander foresees that the enemy will be on the top of the hill immediately he withdraws

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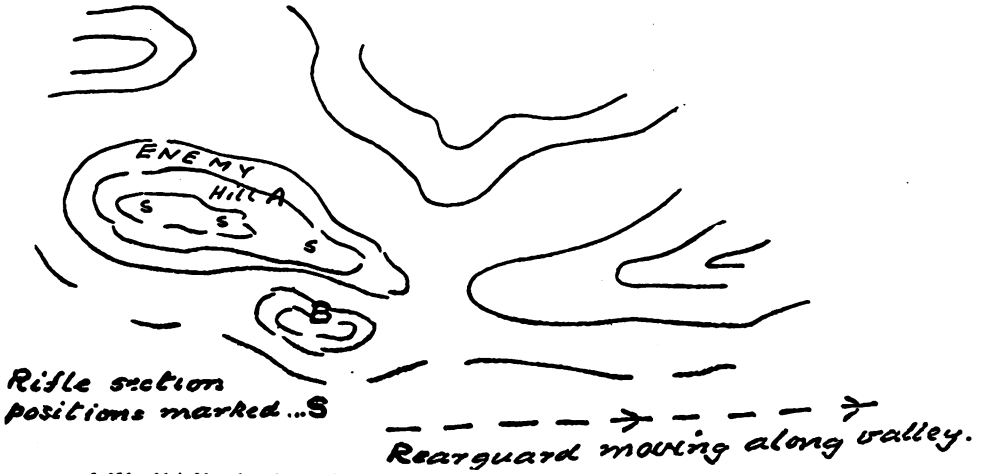
his rifle sections and that it is most desirable to get artillery fire



on hill "A" during his withdrawal. The artillery hearing him engaged may already be preparing to support him, but to make certain of getting this support he sends his assistant with the artillery screen to spur "B" with instructions to send the following call:—"Artillery support—12 o'clock—400 yards—wash-out" repeated once or twice. In this message "12 o'clock" denotes the highest point of hill "A"—the piquet position. Four hundred yards is the distance from the screen to that point. The "washout" is to inform the gunners that the call is a preparatory one. (Note: While the screen is on the move from hill "A" to spur "B" the call "artillery support" should be given on the move to enable the gunners to follow the screen.)

After a few minutes the piquet commander receives the signal to withdraw. He does so by moving the topmost section first and by collecting his sections quickly as he goes down the near side of the shoulder of hill "A". Immediately he is clear of the position occupied by the first section he sends the artillery support call to his assistant, using his platoon semaphore flag. The assistant repeats his previous call omitting the "wash-out." The guns are ready and the first shell should hit the point of hill "A" within a minute of the piquet commander's call. The assistant with the screen (repeating the signals of his piquet commander) may now draw the artillery fire along the ridge of hill "A" when the rifle sections are clear of it by signalling "plus" and "right" with his screen.

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Many objections can be brought against this method of calling for support, but in mountain warfare no method will be infallible.

There may be no cover (unlikely in hilly country) for a man using the screen. In this event no form of signalling will be much good, but a man sitting down using the screen will not be more exposed than a man using a helio or morse flag. The suggested type of screen may be a little more awkward to carry than the present artillery screen which has shorter poles. It is at any rate an instrument in which the piquet commander can place some confidence. The screen now in use is no more than a defence against our own artillery.

Some battalion commanders may not like piquet commanders to work direct with the guns but it is the only way to ensure quick support. Usually the senior artillery officer is with the executive infantry commander—the O.C. advanced guard or rear guard, his guns may be anything up to fifteen hundred yards away from him. He is not, therefore, in a position to control the fire of his guns for quick support—this must be done by the gun or section commander. The difficulty may be partially overcome by attaching an infantry officer to work with the guns, preferably one who has already been attached to artillery. He should have full authority from his C.O. to take action on the calls for artillery support sent by piquet commanders. He will, moreover, be of some assistance to the gun or section commander in keeping him in touch with the infantry situation and in interpreting any messages received. Occasionally the guns may be so far back from their target that an intermediate observation post becomes necessary. In this case the senior artillery officer will probably have to take charge of it owing to the small complement of officers in a battery. However, in mountain warfare it is exceptional for the guns to be very far back. The section commander, in voice control of his guns, can usually see the piquet he is supporting. If calls for support have to pass through unnecessary stations the time taken for the guns to respond will be more than doubled.

Other battalion commanders may think the method too complicated to be understood by some of their piquet commanders, but nothing less complicated will bring accurate fire to bear on the enemy. Training for mountain warfare cannot remain station-

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ary. With each year the danger on the North-West Frontier of India increases; the tribesmen are becoming better armed and better acquainted with our manner of dealing with them. Every endeavour should be made to counter this increase of efficiency on their part by new methods of training.

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TORPEDOED?

An incident of the Gallipoli Campaign.

By Colonel A. F. Thomson, D.S.O.

ON April 15th 1915, His Majesty's Transport "Manitou" left her berth at Alexandria and steamed north for Mudros. In the peaceful days before the War she had, as an Atlantic Transport Line cattle boat, plied to and fro across the Atlantic on her lawful occasions, but at Alexandria she had found herself in strange company—a medley of vessels of all descriptions and sizes collected together at the urgent bidding of the God of War. All, no matter with what high sounding names they had been christened, had had those names obliterated and bore plain numbers as their sole means of identification, all, that is, save one which, with a cargo of cheering soldiery, stole out of the harbour at nightfall on the 14th bearing in large white straggling letters the legend "To Constantinople and the Harem". Poor devils! "Valhalla", as it turned out, would have been nearer the mark.

The "Manitou" had on board the 147th Brigade of the Royal Field Artillery, 29th Division, complete with its ammunition column—in round numbers 600 officers and men and 600 horses. The brigade had mobilized at Leamington and had sailed from Avonmouth in the middle of March. Our destination had been kept officially secret and was known only to the higher commanders, but it had not been difficult to guess that in the war league we had been drawn against the Turk and that, with other unknown troops, we were bound for the Dardanelles with Constantinople for our objective. So early indeed had this appeared to be indicated that one of my subalterns—who shall be nameless—had armed himself with a plan of the Ottoman capital on which the leading jewellers' establishments were clearly marked in red!

During the voyage to Alexandria, a "strategical exercise" was arranged by the O.C. Ship and all officers on board took part. Two companies of the Hampshire Regiment who travelled with us as far as Alexandria enabled the directing staff to include an infantry

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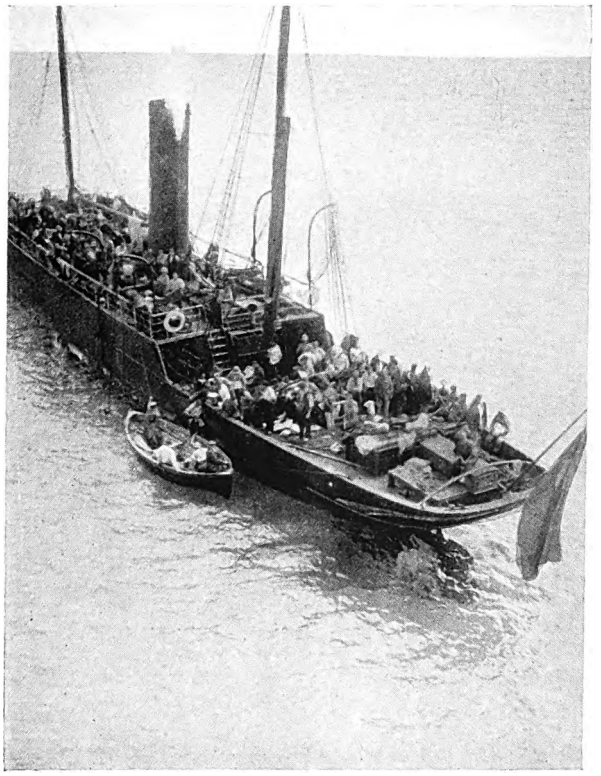
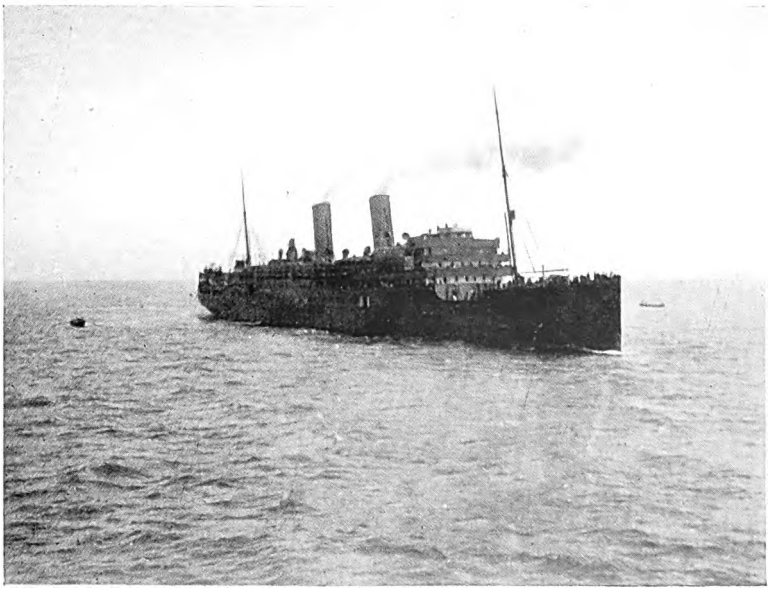


The RECLAIMER coming alongside with men picked up.



The ROYAL EDWARD with boats out doing rescue work.

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officer in the majority of the syndicates of three into which we were divided. Two days were allowed for discussion of the problem which was shortly as follows:—

> "Great Britain and her Colonies and France are at war with Turkey and a force of 3 or 4 Divisions of all arms is being despatched to capture Constantinople. The Allies have command of the sea. Where would you land this force and why?"

My syndicate's solution was "to land the whole force near the Salt Lake",—the scene in fact of the Suvla landing the following August—"and to capture Sari Bair as its first objective". Though a shot in the dark, it is interesting in the light of after events to speculate how such a plan would have fared. It is also almost pathetic to recall that the syndicate which was awarded the bag of sweets put its force on shore at what was later known as "W" beach and proceeded to march on Maidos, with the 29th Division in the van, "Starting point the first I of KRITHIA"!

Our knowledge of the situation as we steamed north from Alexandria was as follows. We knew that the Navy after bombarding the fort at Cape Helles had finished the job properly by sending a landing party ashore and blowing up the guns. We remembered that in our newspapers we had read at breakfast almost daily before we left England, the headlines "Bombardment of the Dardanelles", "*Another* fort reduced". We knew from the notice board in the club at Alexandria that Smyrna was blockaded. And we also knew that the "Manitou" was unescorted and that in accordance with the loading regulations in force at Alexandria, all our guns had been stowed away in the hold and that our small arm ammunition was, for the same very good reason, reposing in the magazine—somewhere in the very bowels of the ship below the horse decks. It is true that at the last moment, two guns of the 10th Battery were stowed on deck, but they were deck cargo pure and simple and their limbers were below with the rest of the vehicles. It is not surprising therefore that the voyage to Mudros was expected to be something in the nature of a pleasant cruise and that the thought of encountering anything hostile afloat in the Aegean never entered our heads. Had it done so, it would have been scouted as preposterous. An absurd idea! But in love, war and business

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almost anything may happen and we were to have a very rude shock indeed.

The morning of the 17th broke fine and clear and at about 10 o'clock, taking my glasses with me as land was in sight, I went up on the bridge to smoke a pipe with the Captain. It was a heavenly morning, hardly a ripple, a brilliant sun shining in the heavens and both sea and sky a turquoise blue. What slight breeze there was came from the north, a chill whisper from the snow-capped mountains of Samothrace. Abreast of us on the port quarter and at a distance of some ten miles, lay the island of Skyros; far astern below a smoke cloud, the funnels and top hamper of some following transport showed up above the horizon. From the troop decks below ascended that maddening, monotonous jargon, well known to everyone who has ever made a voyage on a transport, evidence that Thomas Atkins had settled down to what is apparently his only alternative to sleep when off duty on board ship. "Oo says a card? Eyes on the floo-er! Number nine, Little Jimmy, X-eleven, Top of the rock . . . . 'OUSE. Watch 'im", etc., etc. In that peaceful scene it seemed difficult to believe that we were engaged in the grim business of war. The steady beat of the pulsating engines and the limpid plash of our bow waves as the steamer forged her way through the calm waters of the Aegean, played upon the senses and induced a feeling of happy content in our souls. We seemed to be living in a little care-free world of our own, far removed from the turmoil of strife.

"Hullo, what's that?"

A small vessel had suddenly appeared from nowhere, ahead and a little to port, and was approaching us fast. A first glance through the glasses revealed nothing except that for her small size the craft, whatever it was, seemed to be making an inordinate amount of smoke and fuss. The Captain subjected her to a passing scrutiny.

"What do you make of her?"

"Can't tell you for certain, Major. Looks like a torpedo boat of some sort. Not one of ours anyway. Must be a Greek or a Frenchman". All glasses on the bridge were bent on the fast approaching vessel. "She seems to be making straight for us" said the Captain some minutes later, "perhaps she's bringing us orders

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from Mudros. Would you let me have a couple of your signallers up here—they might come in handy?"

"Certainly", and going to the top of the companion-way leading to the troop deck, I gave the necessary orders and returned to the bridge. Hardly had I focussed my glasses again on to the stranger than I saw two small flags run up her signal halyards. "M.L.[1] That's STOP", said one of the ship's officers with an eye glued to his telescope, and the Captain immediately seized the brass lever of the engine-room telegraph and clanged the order down below. The rhythmic beat of the engines ceased and the "Manitou" at once began to lose way but the torpedo boat continued at speed and approached us behind a bow wave almost as high as the level of her fore-deck. My two bombardier signallers now joined us. One of them mounted a seat on the bridge and waited in readiness to acknowledge by flag any messages that might be sent and the other with pencil and notebook prepared to act as "writer down".

The distance separating the two vessels had, by this time, considerably lessened and it was possible to get some idea of the newcomer. That she was a torpedo boat of sorts was obvious. That she was not British was equally patent, even to a soldier and a landlubber like myself. No boat borne on the books of the British Navy could look like that in any conceivable circumstances. And that group of men on deck—why, they seem to be dressed any old how—no blue about anywhere! "What's that you say? The new naval khaki? Never heard of it".

Silence fell on the group of watchers on the bridge. Doubt, suspicion more infectious than the plague gripped us by the throat. Suspicion gave birth to conviction. Those six ugly looking dagoes on deck were manning, three on either side, what could only be a torpedo tube, and as the vessel changed her course, they kept it steady in our direction. I voiced my conviction to the Captain, but before he had time to reply—well, it all happened very quickly. The little torpedo boat swung round and, reversing her engines, lay to less than 100 yards away on our port quarter. As she turned, a small ball climbed quickly to the masthead and a moment later

[1] International Code.

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the Turkish Crescent broke out and "fluttered in the breeze" as they say in story books.

"That's torn it" said I.

It had.

The stopping of the engines had, of course, been remarked by every soul on board. Those below knew perfectly well that we were nowhere near our destination. Ergo, something had happened. Ergo again, the obvious thing to do was to dash up on deck and find out what was the matter. In any case, all available men were already assembled on the upper deck as the "Fall in" was due to sound in about five minutes' time. And consequently, when a big man in white ducks stepped into the open just forward of the torpedo boat's bridge and raised a megaphone to his lips, he spoke to a full gallery and had the concentrated attention of practically the whole of the "Manitou's" company. What he had to say, spoken in English but with a strong teutonic accent, interested us enormously. None of us had ever heard anything quite like it before:—

"GET OFF DER SHIB IN DREE MINUTE"!

We caught our breath. The hearts of all the listeners beat, I think, more quickly at that moment.

Now, the "Manitou" carried eight boats and eight boats only. Allowing 30 passengers for each boat, eight times thirty makes 240, and 240 into 600 goes once—and 360 over.

The Captain raised his megaphone.

"I havn't got enough boats" he shouted back.

White Ducks hesitated.

"I gif you eight minute" came the reply after a very short pause.

This was decent of him, but why, oh kindly Hun! Why? The same question obviously struck one of the other officers of the torpedo boat who now came up and expostulated vigorously and vehemently. We couldn't hear what he was saying but from the excited action with which he pressed home his arguments, one could make a very good guess. It must have been something like this. "Why on earth are you giving them eight minutes? There's a 7000 ton ship and she's chock full of soldiers as you can see for yourself. We can't miss her. They've sent out the S.O.S. and the

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sooner we make tracks the better. For heaven's sake sink her and let's clear out of this in the Turkish for P.D.Q." Or words to that effect. The argument obviously told. A Hun, not for the first or last time in history, broke his word. The junior officer spun round on his heels, spat out an order to the six dagoes, and in something less than the three minutes' grace originally given us, I saw a long, lean shape leap from the torpedo tube, splash into the water and make a bee line for the dead centre of our ship.

But the rending crash that we all expected did not come. Heaven be thanked for the respite! But for how long? Immediately the Turkish boat disclosed her identity, the O.C. Ship had dashed to the wireless cabin where he gave orders to the operator to send out the S.O.S. The ship's boats were then ordered to be lowered and this was done by the crews that had been detailed for the purpose and regularly drilled during the voyage. But beyond detailing the crews it had been impossible to go in view of the unsatisfactory answer to the simple arithmetical problem already mentioned. No one could have been expected to undertake the invidious task of detailing the passengers to go in the boats in case of emergency. Picture it for yourself. "Ship's order No. so and so. In the event of the ship sinking, the following officers, N.C.O's and men will be allotted accommodation in the ship's boats . . . . All those whose names are not detailed above are prohibited from entering the boats and should make their way to the nearest land under their own arrangements". No! The only solution had been to take the line of least resistance, ignore the difficulty and trust in providence and the British Navy to bring the ship safely to port with a whole bottom.

As we stood on the deck of the "Manitou" that morning, what were the prospects? An utterly defenceless ship with engines stopped, blue sky, a placid sea and an enemy torpedo boat less than 100 yards away with no other ship in sight except that far-off cloud of smoke on the horizon. Not a man on board would have given sixpence for the "Manitou's" chances of remaining afloat. It was a walk-over for the torpedo-boat. The "Manitou" could certainly not be classed even as a starter. So it amounted to this, that we were all, without the slightest doubt, going to be swimming for our lives before very long and that those who wished to get off

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the ship before she went down were at liberty to do so. At that early stage of the war, all that the average soldier knew about torpedoing was what he had read in the newspapers of the loss of the three battleships, H.M.S. "Cressy", "Hogue" and "Aboukir", when very many lives were lost, and he therefore imagined that if an ordinary passenger ship such as the "Manitou" were to be torpedoed, she would go sky high in small bits. Small wonder, therefore, that many of those aboard chose the alternative of going overboard in order to avoid the explosion and the possibility of being sucked down by the sinking ship. Large numbers went over the side.

From the bridge I made my way as quickly as I could to my cabin where I put on my life belt and, taking a flask of brandy and some chocolate from my haversack, put them in my pocket. Regaining the deck, I was just in time to see a second torpedo leave the tube. It came straight towards me and I remember instinctively looking up to see whether all was clear overhead or whether any rigging intervened to obstruct my free passage skywards. I held on tight to something . . . . Now!

But again nothing happened. I moved quickly along the deck. Most of the boats were already in the water. I leaned over the rail between two jerking davits and looked down. The boat was suspended a few feet above the water, its further progress stopped by men who, stepping out from the deck below me, were grasping the falls of rope and passing themselves down hand over hand. As I watched, more men reached out to the ropes and swung themselves clear of the ship. The strain was too much and, with a report like a gun, the davits on either side of me snapped off short in their sockets and fell inwards and downwards. For a fraction of a second I saw agonized faces upturned in the boat—I can see them still. The boat splashed into the water. One after the other, men, still grasping the ropes in their hands, fell headlong in rapid succession on their comrades below and then, just as the struggling mass was overturning, the heavy davits with a sickening thud crashed fair and square . . . .

I heard my name being called insistently and, some distance away I recognized one of my N.C.O's standing up in the stern of a boat. He implored me to leave the ship but I waved my hand

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to show him I was not coming and turned away. Exactly why I cannot say, but from the very start I had subconsciously decided to remain on the ship as long as there was something to stand on. Perhaps my mind harked back to a summer afternoon on the Severn years ago when, as a small school boy, I had stayed too long in the water, been seized with cramp and only rescued with great difficulty. In any case I think it was the certain knowledge that in that very cold water I could not hold up for long, that decided me to delay the final struggle as long as possible. I was certainly not swayed by any vain hopes of rescue before the ship went down.

Making my way forward I joined a small group of officers who were busying themselves in throwing overboard everything that they could lay their hands on that would float and it was whilst we were engaged in this task that the torpedo boat was suddenly discovered to be on the move again. She made off in a direction at right angles to the "Manitou" on the port side, and then turned and stopped broadside on at a distance of perhaps a mile. What was she up to now? Would she open fire with the gun which we had noticed on her deck and which looked like a 6-pounder, fire more torpedoes or what? How long she remained over there I cannot say, but as we were momentarily expecting something to happen, it seemed a long time—perhaps a quarter of an hour or thereabouts. Up in the bows we discussed the situation the while we fortified ourselves for our long swim by sipping brandy from our flasks and munching chocolate. Some were for going overboard and swimming for it, arguing that to remain on the ship when she went down would not give one a fair chance. One of my subalterns came up and asked if I "minded his going over". We watched him and others let themselves down by a rope hanging from the bows and swim away from the ship. The transport which had followed us out from Alexandria—one of the P. & O. fast steamers of the Brindisi—Port Said route as it turned out—came up and seeing us in trouble, passed us at top speed. This wise but apparently unfriendly act was, I believe, in obedience to instructions issued by the Admiralty as a result of the torpedoeing of the "Cressy", "Hogue" and "Aboukir" already alluded to.

A shuffle on the deck behind me, and turning round I beheld my subaltern very wet and shivering.

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"What on earth are you doing here?"

"Well, sir, I found the water so d . . d cold that I thought I would come back, so I swam to the ladder and here I am" ! This did not sound promising ! I took my boots off; slacks would only be in the way and hinder me, so off they came too; socks and pants, nothing to keep them up now—off with them ! Finally, in the buff from the waist downwards I felt prepared. Prepared, but of confidence in myself to swim for more than a few minutes I had none. And then the curtain rang up for the final scene.

"She's coming back again" called out someone, and all eyes were at once turned in the direction of the torpedo boat which was seen to be approaching us at full speed with smoke belching from her funnel. Well, we were in for it this time ! Whatever it was that had gone wrong before, we felt would not go wrong again. All that time she had spent over there had obviously been employed in overhauling her beastly torpedo gear, and having satisfied herself that all was now functioning properly, she was coming in to finish us off. We watched her fascinated and in silence. Closer and closer she came and when well within her old range of 60 to 80 yards, round she swung and disclosed the same old six dagoes at the torpedo tube. A flutter of white foam below her stern as the engines were reversed. Now she's steady. Splash ! Torpedo number three was on its way.

"We're for it". Damn it ! why was my mouth so dry? "Hold on, you lads" said someone, and then the same someone began counting slowly—"One, two, three . . . . four . . . . five . . . . six . . . . SEVEN ! A breathless pause, and then—"By God, she's missed us again !"

Whatever the cause of this third failure, the old "Manitou" still rode the waters of the Aegean inviolate. Slowly turning, the torpedo boat passed across our bows within biscuit throw, her crew standing on deck and gaping in speechless amazement and mortification at the ship which they had held so utterly at their mercy. With black smoke pouring from her, she rapidly dwindled to a mere speck on the horizon and was then lost to view. Our ordeal was over.

It was then that I saw one of my Acting No's 1 approaching across the deck. He drew himself up to attention and saluted.

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"Yes, Corporal Hartney, what is it?"

"All horses 'B' Sub. watered and fed, sir."

Good lad! I had forgotten *them*.

The work of rescue was now pushed forward but at first the "Manitou" with all her boats away was unable to take a very active part in the proceedings. Steam had been blown off from the boilers by the ship's engineers and volunteer stokers were called for. Boats and swimmers had, by this time, drifted far astern and looking through one's glasses it was astonishing to see what an enormous area they seemed to have spread themselves over. After some delay the ship was turned round and steaming very slowly through the "occupied area" offered her gangway as a haven of refuge to all who were not too exhausted to swim to it. A diminutive special service vessel named the "Reclaimer", commanded by the breeziest of naval officers turned up very early on and did great work in picking men out of the water. Two destroyers going "all out" appeared from Skyros heading in the direction taken by the torpedo boat but vanished over the horizon without, so far as we could see, getting within range of their quarry. During the afternoon various ships which had been despatched from Mudros in answer to our S.O.S. call arrived, rescued survivors were transferred to the "Manitou" and eventually the interrupted voyage was resumed. But alas! at roll call held on board that evening there were several absentees. The broken davits had accounted for more than a boatload. Others, as we had seen for ourselves that afternoon, had died in their lifebelts from exposure.

Late that night, somewhat about 11 p.m. when we were sitting in the smoking room playing bridge, we heard the engines slow down, and going on deck were told by one of the ship's officers that we were just off the entrance to Mudros Harbour. It was pitch dark with a cold wind blowing and the land, though quite close, was invisible. A challenging light blinked on shore.

"WHO ARE YOU?"

"Umpty-umpty, iddy-umpty, umpty-iddy . . . ." clicked our answering lamp from the bridge above us.

"Here—you're quicker at Morse than I am. Spell it out. They'll be expecting us and this is probably to tell us that they've got hot drinks ready"!

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Letter by letter the message came through:—"ENTRANCE FORBIDDEN AT NIGHT".

"Well that's that! There's obviously nothing doing before daylight so I'm for turning in. Good night all", and following the speaker we dispersed to our cabins whilst the "Manitou" with her engines running half speed, bore away from the island and settled down to plough her lonely furrow through the night.

Very early the next morning we entered Mudros Bay which we found crowded with transports and allied warships of all descriptions. Just inside the entrance we narrowly missed colliding with the "Henri IV"—an antiquated French battleship which looked as if she had taken in the washing of the entire Mediterranean Expeditionary Force and had got it hanging out to dry. Soon after we had dropped anchor the C.R.A., 29th Division, came on board to welcome us and told us that as no further wireless message had been received from the "Manitou" it had at first been feared that she had been lost and he had started to re-write his operation orders for the Gallipoli landing leaving out all reference to the 147th Brigade, R.F.A. But the brigade was far from extinct and has left behind it a fine war record of its services in Gallipoli and in France.

By a mere coincidence I was fortunate enough to hear the denouement of our adventure at first hand. Mudros Bay, though landlocked, is not a good anchorage as the surrounding land lies too low to afford much protection against strong winds, especially from the north, and on more than one occasion before the landing the transports of the M.E.F. dragged their anchors. On the afternoon following our arrival I, with some other officers, rowed across to the "Andania" and on the way back found it impossible to make the "Manitou" against a very strong head wind. So we pulled to the nearest ship with the intention of taking a breather and were at once invited on board. She proved to be the light cruiser "Minerva" and it was this very vessel which, we learned, had closed the account with the Turkish torpedo boat. We were told that the latter, after leaving the "Manitou", had headed for Smyrna via the southern end of the island of Chios, but on rounding the island and turning northwards, she had found herself confronted by the "Minerva" which had been despatched from Mudros

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with the special object of cutting off the torpedo boat's very obvious line of retreat after her exploit. With the "Minerva" in front and two destroyers coming up fast behind her the torpedo boat's position was hopeless and her commander did the only thing possible in the circumstances—ran her ashore on Chios, her crew dispersing inland.

Questioned as to the reasons for the failure of the three torpedoes to take effect, the commander of the "Minerva" explained that this was undoubtedly due to the short range at which they were fired. A torpedo fired from an above-water tube, very naturally makes a dive before finding its travelling level. This dive took all three torpedoes *under* the "Manitou"—had they been fired from a submarine at the same range instead of from a torpedo boat we should have been hit every time. This explanation was, I understand, subsequently accepted as the official view.

We were also told that the boat had originally come from Smyrna having run the gauntlet of the blockading ships by night; that she had carried three torpedoes and three only, and that her object in withdrawing to a distance after firing her second torpedo had certainly been to reload her tube without danger of interference. But why she did not use her gun is a point that will never be cleared up.

Such is the story. Within a very few days we were engaged in the sterner adventure of the Gallipoli landing and the incident, overshadowed by greater events, faded from our memory. And after all, it was but a very minor incident of a very very great War.

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SHOW-JUMPING.

By "Equinox."

UNTIL about twenty years ago show jumping was regarded, in this country, as one of the black arts. It was known to be very popular on the Continent, but in England its exponents were confined to a few enthusiasts, who were often laughed at as trick riders. Looking back it is difficult to see why it was treated as being a freak variety of horsemanship, and it was not until the first International Horse Show at Olympia that the public as a whole, and British officers in particular, began to take an interest in the game. Since the war show-jumping has grown in popularity and there is little doubt that nowadays most of the agricultural shows rely on the jumping classes more than on any other event to fill their enclosures. This popularity is traceable as follows:—

First, the very greatly improved standard of jumping. In almost every show are to be seen good riders and well-trained horses.

Next, the work carried out by the British Show Jumping Association, which was formed in 1921. The association has greatly helped by standardizing a system of faults and marking, and by endeavouring to ensure well-built and spectacular jumps.

The method of marking faults is fairly widely understood, so that many spectators can, and do, mark each horse as it performs, and foretell with exactness the eventual decision of the judges. Such is not the case with other horse-show events, and this in itself tends to add to the interest of the jumping classes.

Show jumping has long been to the fore on the Continent, and there are numerous important horse shows in which the jumping competitions form the bulk of the entertainment. This is chiefly due to two causes. Firstly packs of hounds are scarce, and in consequence hunting is difficult to get. Secondly the art of equitation has, until recently, been studied much more closely in continental than in English schools. Study of theory is of great interest, but practical exposition makes it more so, and we find

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A free head, arching his back well over an upright fence.

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that haute-école and show-jumping are the natural outlets for these studies. The former requires the most perfect combination of man and horse that can be produced, and the latter involves an exactitude of training and produces a spectacular performance.

Show-jumping must not be confused with hunter trials. A hunter trial is organized in order to choose reliable hunters of a good type, and the fences, conditions and marking are all directed to that end. Show-jumping is not meant to be in any way similar. Jumping competitions are arranged to show the degree of perfection that can be attained by a good horse controlled by a skilful rider. Criticism of show jumping is sometimes based on a false comparison with hunting, and is often made by those who have never attempted to ride a show-ring course.

It may be said at once that few horses can, when untrained, be picked out by looks as probable show jumpers; because a horse appears likely to jump well it is no argument that he will do so. Whilst, obviously, all horses improve with schooling, it may be taken as an axiom that a show jumper is born with his talent in him, to be developed by training. Show jumpers should possess the following characteristics:

(a) Boldness–under all conditions. Show-jumping is essentially a cold-blooded sport and the horse is required to perform alone, in a strange place, and often under the most adverse circumstances. Conditions of travel, crowds, types of jumps and officials in the ring; all are different to his own training ground, and yet he must accept them as normal and give of his best. Success is impossible unless he has a stout heart.

(b) The ability and the inclination to jump "clean" at the standard required. At most competitions there will seldom be a jump over 4 ft. 6 in. high, but at some of the larger shows and particularly on the Continent the horse may be required to jump somewhat higher. It is doubtful whether jumping "clean" can be taught (see later remarks on rapping), and, provided the horse is well ridden, he either has the art or he has not. If he has not he will never make a show jumper. Few things can be more exasperating than riding a careless horse in the show ring.

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(c) A consistently good performance. Many horses are apt to get careless if asked to jump round the ring more than once, or at the most twice. A show jumper may be called upon to jump three or even more times during an afternoon, and must jump his best on each occasion.

The perfect show jumper should jump with ease and assurance and without excitement. A restive horse is difficult to control, and one that lacks confidence is always liable to lose his nerve altogether.

He must jump in his stride, landing well out on the far side of the jump. This is the ideal and difficult of attainment. Even the best horses and best riders are certain to make mistakes occasionally, causing the horse to come wrong at the jump. In that case he should still be able to clear the fence or at least to make a very good attempt at doing so.

When the horse takes off at the correct place he will seldom hit the jump with his forelegs. In other words he judges to clear in front, his instinct telling him that it is often dangerous to hit a jump in front and not quite so unpleasant to hit it behind. After he has taken off, the more that he can lower his head and arch his back, the less likely will he be to touch the jump with a hindfoot. Once the centre of gravity of horse and rider is past the highest point of the jump the difficulty of negotiating that particular obstacle has been overcome, except in the case of spread fences and water.

The points of a good show jumper and a good hunter are very similar. It has already been stated that looks are no guide to performance, and the following points are merely stressed as being of importance:—

(a) A good head and a kindly eye. A sulky horse or one of a vicious disposition will be difficult to train and apt to grudge giving of his best.

(b) A good rein. The better the rein the better the balance, and balance is essential to control, without which there can be no success.

(c) A good shoulder and forehand. The first effort of any jump—particularly if the horse is taking off too near the fence—comes from the loins, but acts through the forehand.

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(d) A short back leads to greater power and to better control of the legs. There are many good jumpers with long backs, but they are difficult to place, and are apt to touch behind.

(e) Good bone and good feet. Continual show jumping over large jumps throws considerable strain on the horse's legs and feet, even when the landings have been prepared. No horse will jump if his feet or legs are troubling him.

(f) Powerful thigh and gaskin muscles. A horse in the act of taking off uses these muscles to the utmost. The push thus given is the deciding factor, either it is sufficient and the horse clears, or too little and he knocks the jump down.

There are successful show jumpers of all ages, but as a general rule a horse is not at his best until over ten years old. Probably a young horse will do the more brilliant jumps, but it is usually found that the old stager is the more reliable. This is possibly due to the fact that experience tells, the self-preservation instinct becoming greater as the horse ages. In any case it is a fact that many horses have not jumped at the top of their form until twenty years of age or even older.

Height is an advantage, and a small horse has to be well above the average to compete successfully at show jumping. There have, of course, been brilliant exceptions, but a height of 15 hds. 3 ins. can be taken to be the minimum that is required.

The rider in the show ring is much criticized. This in itself is good; criticism should lead to improvement, and improvement should be the aim. This criticism often comes from those who are ignorant of the art they criticize. Those who have the necessary knowledge, realizing the difficulties, are content to remain silent.

Until recently it was the custom in many jumping competitions to allot so many marks for the style of the rider. These marks were frequently awarded by judges who had never ridden round a show ring. Such marking has now been almost universally discarded, and judging is concerned only with combined performance, as registered by refusals and by jumps knocked down. An ugly seat is not necessarily an inefficient one.

Equitation is a large subject and there is no place here to discourse on the rider's seat over a fence. It must suffice to say that the rider requires:—

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(a) To control his horse during the approach to the jump. This will be studied fully when discussing training. It may be said here that control means control of pace, stride and balance.

(b) To avoid interfering with the horse's mouth during the jump; this involves maintaining a perfect balance of his body. It has already been stated that a show jumper should jump with a lowered head. A pull on the mouth, however slight, will prevent this and will cause the centre of gravity to be moved further back, with the almost inevitable result that the horse will drop one or both of his hind feet. Further, a pull on the mouth will almost certainly lead to bad jumping if not to future refusals.

The initial push as a horse takes off at a large show fence is considerable—particularly if the pace is fairly slow—and both balance and anticipation are essential if the rider is to avoid being left behind. The danger of being left behind is greatly increased if the horse takes off unexpectedly, and for this reason it is advisable always to ride in a martingale or breast-plate. Should the rider fear an exceptionally large (or awkward) jump he can "strap hang" with one or both of his little fingers.

The difficulty of getting the body forward sufficiently far at slow paces is considerable, and may necessitate the rider standing in his stirrups. From that position he can get much further forward than if he was sitting down in the saddle; on the other hand it makes it extremely difficult effectively to use the legs, and should not, therefore, be adopted as the seat whilst approaching a jump. It is easier to get the body forward if the stirrups are fairly short and, as a general rule, it will be found that for show jumping the rider rides one or two holes shorter than for ordinary riding. Only such a grip as is necessary to maintain a firm seat up to the moment of the take-off should be used. Excessive grip worries many horses and is liable to cramp their performance. From the moment the horse has taken off until the moment he lands, provided—and it is an important proviso—the horse is not interfered with, the position of the rider's body is almost immaterial.

Riders frequently get into the habit of looking back, or down, at the fence being jumped. It is a habit easy to acquire, is useless

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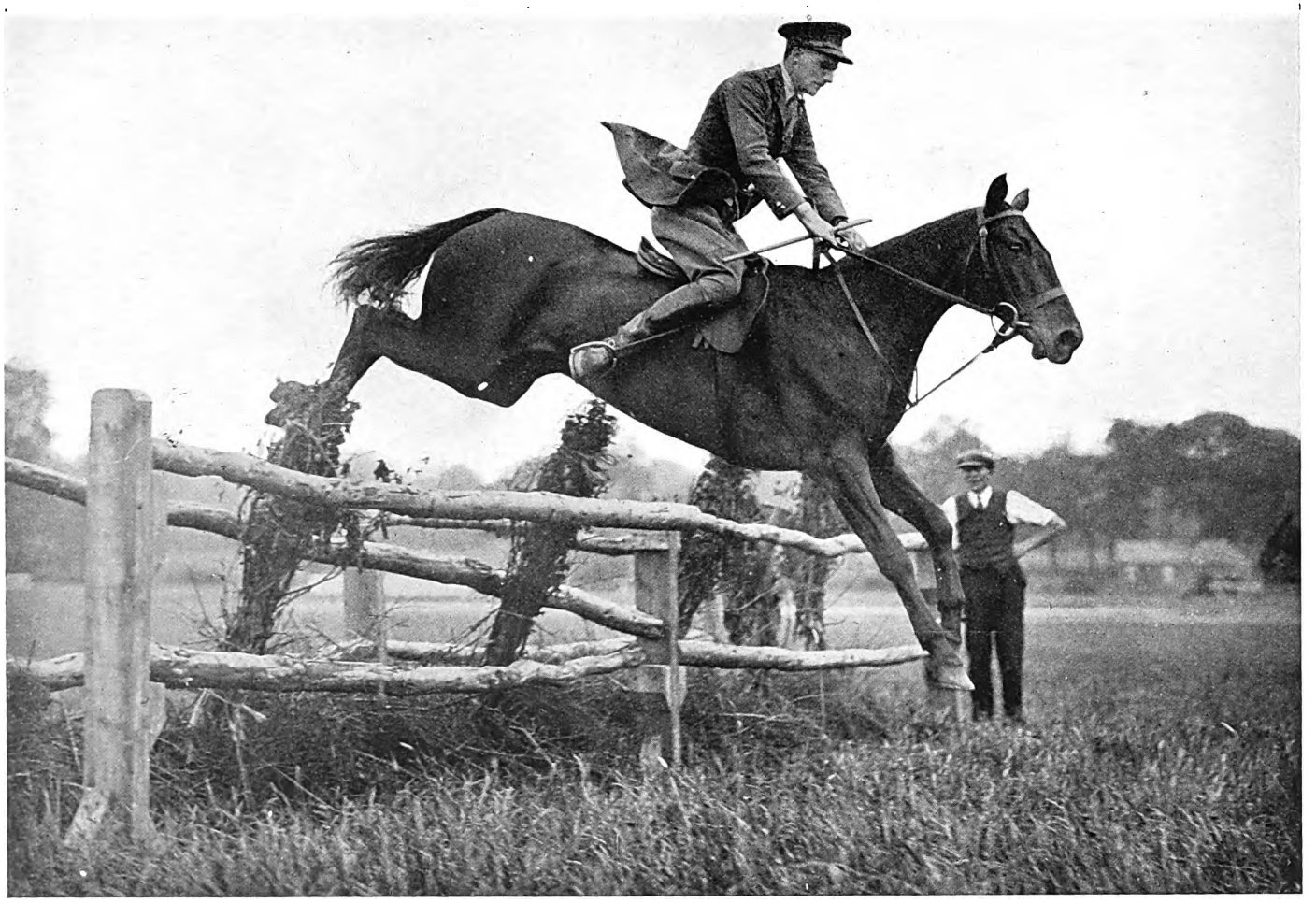

Ridden into his bridle and jumping well out over a spread fence.

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and should never be allowed to develop. If the rider has time to think of anything he should be considering his approach to the next fence.

The majority of show jumpers are taught to jump by one of two methods, and there is some controversy as to which produces the best results.

With either method the secret of good jumping is to get the horse to take off at the right place; the place being chosen either by the horse or by the rider. It is obvious that as a jump becomes higher so it becomes more difficult to clear, but the reason lies not in the height (almost all show jumpers could clear 5 ft. 6 in. or 6 ft. with ease) but in the take off. Any horse has a certain height that is the maximum that he can clear, but in order to do so he must take off at one particular spot. As the height of the jump is decreased it will be found that, instead of there being only one spot for the take off, the horse will clear provided he takes off between two points, and thus the clearing of the obstacle becomes easier. Distances naturally depend on the size and capacity of the horse, but a rough guide is that the centre of the take off area will be slightly further from the base of the fence that the fence is high.

As well as special training for jumping, it is important that the horse should carry out ordinary school training. The more highly trained a horse is the better will he jump. In particular he should be taught to respond instantly to the aids for changes of pace. This training should be carried out by the man who will eventually jump the horse. He should do special muscling work. Plenty of ordinary walking exercise will help assisted by work up and down hills. The horse should be ridden up to his bit all the time, so that he gets his hocks underneath him and uses them to maintain balance and impulsion. Lateral work at walk and trot has valuable results on the muscles of neck and loins, and jumping down a low grid will assist in suppling the spine.

The question of the type of bit to be used is closely connected with the rider's control of the horse. Balance and control are essential, and no bit that does not give the rider reasonably easy control should be used. Horses undoubtedly jump "big" in a snaffle, but tend to get out of hand, and for most horses a short cheeked double bridle will probably prove the most satisfactory.

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As in the case of men, most horses prefer, when jumping, to take off on one foot rather than on the other, and although there is no great difficulty attached to teaching a horse to jump with either foreleg leading, better results will almost certainly be obtained if the horse is always made to approach the fence with a particular foreleg leading. This may make it necessary to pull up once or twice during the round in a ring, but despite this disadvantage it should be done.

The time to be spent on training will naturally vary considerably, depending on the fitness of the horse, the standard of training to which he has already attained, etc. For a horse of average fitness and one moderately well schooled, it is reasonable to assume that he will not learn to show jump in under six months if the rider is to control his stride, or under eighteen months if he is to put his stride right himself. Like all forms of instruction, training for jumping should be progressive and a programme must be prepared and thereafter be strictly kept.

Two principles governing early training are that the horse must like his work, and jump with real impulsion. It may be as well to begin by loose-rein riding over a spread fence, such as a double oxer, a small triple or double bar, or a small water jump with a guard rail at each side to ensure jumping clear. An alternative to loose-reining is longeing, using a long rope and wings over which the rope may slide. The sensible use of a long whip by an assistant will ensure that the horse makes his effort with decision. If a start is made with upright fences, it may be difficult later to school over spread fences and water, as the horse may have learned to arch well but land steeply or jump too short. Each day's schooling should be restricted to one or two types of fence of moderate size, say 3 ft 9 in. Later on three or four fences of show height may be jumped say every ten days. When jumping in the open the landing must be soft.

Whenever possible a horse should be schooled inside a closed school as well as in the open. The closed school has three advantages; firstly there are few distractions so that the horse can concentrate on the work in hand, secondly the take-offs and landings are invariably good, and thirdly the horse is taught to jump in a small area—a training that is almost essential if he is afterwards

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to compete at Olympia or Islington. Jumping out of doors is, however, no less essential if the horse is eventually to do himself justice. Outside he gets to disregard his surroundings, however unusual. The final stages of training should include getting the horse used to strangely coloured fences, bands, crowds, men standing near jumps, etc. With a bold horse, and one that has received an unhurried and progressive education, it will be found that few of these diversions upset his jumping in any way.

Rapping a horse's hind legs to persuade him to jump "clean" is a doubtful road to success, and a horse properly trained may not need it. Better results are achieved by making every jump offer some resistance to a horse hitting it (this does not imply solid jumps). Rapping has another great disadvantage; it is extremely likely to lead to refusals; the horse seeing a judge, or other official, beside a fence in the ring suspects a rap and refuses.

The provision of suitable jumps is a most important preliminary to training. It is however frequently overlooked, with great delay and, possibly, injury as the result. Of all forms of construction required for equitation that involved in building a jumping lane is, without question, the most difficult. The first five requirements are :—

(a) The lane should be straight.
(b) The sides should be constructed of poles and not walls.
(c) The ground should be reasonably level, and the "going" must be good.
(d) Each jump must be solid. It is no good having in a lane a jump that can be knocked down.
(e) Cover must be provided on each side of every jump so that assistants can stand in the lane to stop a horse hesitating and so losing impulsion. This chiefly applies when jumping horses loose down the lane.

Habit (in the horse) must be avoided and thus the following additional points are essential :—

(f) Each jump should be capable of being moved from one place to another.
(g) It must be possible for any jump to be raised in height from the minimum (say 2 ft.) to the maximum (say 4 ft.) by steps of 3 in. at a time.

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Six jumps of various types in a lane are sufficient, and they should be not less than 15 yds. apart. A manger should be built at either end of the lane so that a reward—usually in the form of a feed—can easily be given.

For work outside the lane the jumps used should be light enough to be moved easily from place to place and, when erected, although not solid, they should offer some resistance if the horse hits them. A very suitable jump can be formed by using as the jump a single rail, fairly strong, and as supports at each end tripods. These tripods consist each of three poles passing through a loose iron ring; thus by sliding the ring up or down small changes of height can easily be made.

There are many obvious ways of varying the type of jump using the construction described above. The following are some suggestions:—

(a) Extra rails may be suspended by cord from the top rail, thus forming a post and rails.

(b) A guard rail, supported on bricks, may be put on the take-off side in order to form an open ditch.

(c) A canvas sheet, painted any suitable colour, may be hung over the rail so that the jump represents a wall.

(d) Three such jumps may be brought together so as to form a triple bar.

As a general rule three jumps, of the construction described, will be found sufficient to carry out all varieties of schooling.

The construction of a water jump is exceedingly difficult and probably unnecessary; in fact it will often be found, should a water jump be available for schooling, that the horse takes a great delight in jumping into it, or so it appears. In order to teach a horse to jump water, all that is required is to have a take-off fence with something unpleasant of the width required lying on the ground beyond it. This may take the form of gorse or of sheets of corrugated iron; the width of a jump so constructed is infinitely variable and is easily altered. But if water is readily available the trainer is advised to use it, having a fence or rail on the take-off side, and a rail on the landing side to ensure a clean jump. The first schooling must be over narrow water, the size being increased gradually so that the horse is not tempted to jump into it.

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Jumping with a straight back and failing to clear behind.

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Now as regards the methods of training by which the horse is brought right to his fence. The first method we will discuss is that most used on the continent.

In this method the rider merely controls the pace (i.e. speed) of his horse, the horse having been taught to get his own stride right, collect himself and take off without any further aids. The pace chosen may be fast or medium, but is usually fairly fast, and can be discovered either by observation or trial. In favour of this method it is said that a horse is less liable to make a bad mistake than a man, and also that the rider's task, difficult enough at any time, is greatly simplified. Against it there is the undoubted fact that it takes a long time to teach a horse to jump by this method, and it is also reasonable to assume that the determination or will power—call it what one may—of the rider makes some difference to the effort that the horse puts into his jump. It has another disadvantage in that training a horse involves the use of a jumping lane, both difficult and expensive to construct and requiring a large number of assistants in use.

The pace chosen must be suitable to the temperament of the horse and to the size of the obstacles. The horse watches the fences and, by shortening or lengthening his stride where necessary, brings himself to the right place to take off. The rider meanwhile sits still without interfering with the horse, and endeavours to anticipate from where he will jump.

The training can be divided into four parts :—

(a) Loose jumping in the jumping lane. There should be two assistants out of sight behind the cover at each fence, and their job is to keep the horse moving and prevent him from losing impulsion. To achieve this it will probably be sufficient if they stand up as the horse lands over their fence. The jumps should be started low and be worked up, by easy stages according to the aptitude of the pupil, to a height of 4 ft. The horse must be worked at loose jumping until he readily takes all the lane jumps in his stride without a check of pace.

(b) Mounted jumping in the jumping lane. This is practically a repetition of the free lane work, the object being to accustom the horse to the rider's weight, and it should be just

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as gradual. It is important that the horse learns to treat this lane-jumping as nothing out of the ordinary, and to this end the rider, having walked his horse into the lane, should make a point of always halting a short time before starting at the first fence.

(c) Mounted jumping in the open. The rider should start over low single fences and increase their height gradually until the horse will take a jump of 3 ft. 9 in. wherever it may be placed. The horse should carry out all this work at the pace that was found to be the best in the jumping lane.

(d) The final stages of mounted jumping can be devoted to schooling over several jumps laid out as a series, to stopping and starting (often necessary in a small ring) and to an occasional jump round a full-sized course.

The faults that are likely to occur are:—

(a) The horse getting too close to the fence before taking off. The best cure is to place a low rail—say 9 in. high—some 17 ft. on the take-off side of each fence. The exact distance depends on the length of stride of the horse and can only be discovered by trial. The horse jumps the rail, takes one stride and jumps the fence. The use of this rail should not be continued for too long, or the horse will get always to expect its help.

(b) The horse rushing his fences. This may be due to the horse being naturally of a highly-strung nature, or to the rider worrying his horse by not sitting still, or too violent an application of the aids at the start. The cure is to return to loose jumping, placing the jumps at awkward intervals, and afterwards, in the open, to circle the horse several times before each is jumped, not allowing him to go over until he is quite calm and settled.

(c) Refusals (dealt with separately).

In the second method the rider's task is to control the stride of his horse, lengthening or shortening it as necessary, bring him to the correct place to take off and give him the office. The advantages of this method are that the training can be accomplished fairly quickly, and also that the horse receives assistance, or drive, from the rider at the most crucial moment of the jump, the take-off.

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Control of stride, however, involves an exact judging of distances, no easy matter, and mistakes are difficult to rectify. As a result perfection can only be achieved by a few. Nevertheless there is little doubt that for the great majority of horses this method, if correctly carried out, does produce the best results. In a few isolated cases the exact control involved may be irksome to the horse, whereas if allowed to go on at his own pace he would jump well. It is useless to expect that a horse's stride can be controlled unless he is exceptionally well schooled. He should respond instantly to the lightest aid, increasing or decreasing his pace without hesitation. From this it follows that much time will be spent on this side of his schooling, and the rider should not be satisfied until he can place his horse's leading foreleg on a definite spot every time.

The vital period is from the time that the steady approach canter is lengthened until the "office" is given for the take-off, and during this period the pace must be increased sufficiently to give momentum for the jump. For almost all horses it will be found that three paces are sufficient for this increase of pace, that it is difficult to sustain impulsion if more are taken, or to gain it if there are less.

The distance from the jump at which the three lengthened strides should commence is best decided by trial, but as a rough guide it may be taken to be about five times the length of one stride taken by the horse during his steady approach canter. The rider himself requires great practice in judging this distance, and on his ability to do so accurately depends whether the jump will be cleared or not. It is no sinecure to select exactly the right spot from which to start the increase of pace, and the beginner will probably make many mistakes.

Training is carried out over single fences which are gradually increased in height until 3ft. 9 in. is reached, the rider doing his best to ensure that at each jump, however low, the horse takes off at the correct place. During the early stages of the training the rider is well advised always to pace out carefully the distance from the jump to the point at which he intends the horse to commence lengthening his stride, and to place some small mark there. He then aims at getting the horse to place his forefeet on the mark,

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take three strides of increasing length and take off. As the horse becomes proficient so he can occasionally be schooled over a series of fences, and also over fences of standard size. It must not be thought that increased speed during the last three strides is essential. The pace of the approach canter should with most horses be sufficient to carry the horse to the fence so as to arrive with the necessary impulsion, increase only being necessary when the normal stride would bring the horse wrong, but it is found that some increase is nearly always necessary. The horse must arrive balanced and with impulsion to jump; hence too sudden an increase may get the horse unbalanced, on his forehand or behind his bridle. Quiet, effective use of the legs and good steady hands play an important part in producing the horse in a balanced state. There are some riders who shorten one or more of the final strides, but this requires great skill, may lead to refusal, and is not therefore advocated. In riding at water the same principles apply; but a slightly increased pace may be necessary both in the approach and in the final strides. Balance is essential.

If the training has been planned on sound lines, and has been conscientiously carried out, there should be few refusals. These may conveniently be grouped as:—

(a) Those due to physical pain, or to fear of it (i.e. fear of jumping on the hard ground).

(b) Those due to fear of the jump, or of its surroundings. Refusals due to these reasons are usually caused by the rider hurrying the training and facing the horse with unusual obstacles too soon. A fall, of the horse, is almost invariably caused by using an unsuitable jump, and is liable to put a horse off jumping for a considerable time. In such a case the trainer must start at the beginning again and work his horse gradually on to the stage where he experienced trouble.

(c) Those due to fear of interference from the rider during the jump. Of all types of refusal these are the most difficult to cure, and a show jumper once badly ridden may take months to recover his best form.

(d) Those due to staleness. Such refusals do not often arise unless the horse is too frequently schooled over big fences. A complete rest for a week or more will usually put matters right.

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(e) Those due to perversity. Although there are a certain number of refusals due to this cause, the rider should be certain, before punishing his horse, that there is no other likely reason. If, however, a horse is refusing from perversity he should be punished quickly and firmly. He should be punished standing still and not on the move. Whether he faces the fence or away from it is probably immaterial (few people agree on this) as long as he does not run away from his beating or jump the fence from a stand. The main objects are to jump the fence at once, and never to have a refusal there again. It may be as well therefore to leave the fence after jumping it, and tackle it again in a day or two, after having lowered it. Perversity is a mood often born of high feeding and low exercise.

If a horse's refusal is due to fear of the jump or its surroundings, the rider should let him look at the cause of his fear, whilst soothing him with hand and voice, and then re-present him at the fence.

Ring-craft cannot be taught in an article and only the constant performer can expect to learn the finer points of the game. The following hints are recorded, not because they are the only ones necessary to follow, but for the reason that they are some that are frequently overlooked:—

(a) It is surprising how many show-ring riders fail to realize the importance of giving their horses plenty of exercise before jumping. Most jumping shows are held in the afternoon, and if this is the case the horse can be given at least two hours' exercise in the morning. Three hours would not be too much if he is really in condition. Unless the horse has had this exercise he will arrive in the ring either half asleep or else jumping out of his skin, depending on his temperament, and in neither case is likely to perform well.

(b) The approaches to jumps are often slippery, and become more so as each horse goes round the ring. The horse should, therefore, always be provided with some means of getting a grip on the ground. Projecting nails (put in on the show ground, and removed before leaving) can be used, but screw-in frost cogs are better. Ordinary frost cogs are too big and should be filed down. The shoes are made with tapped holes, and the cogs can easily be screwed in. It is sufficient to put one on the outside of each fore shoe and one on either side of each hind shoe.

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(c) The rider should always wear spurs—however short—and carry a stick. Both may be required, and there is no excuse for failure if the rider is without them. However inclement the weather neither a macintosh nor anything similar should be worn.

(d) If a show-jumper has a long tail it is as well to plat it. Touch laths may be removed unless this precaution is taken.

(e) In nearly all shows the rider is permitted to walk round the course on foot. No opportunity of doing this should be neglected, and the rider can note types and size of jumps, approaches, take-offs, etc.

(f) It is only the fortunate few who do not suffer to a greater or lesser extent from nerves, and this is instantly communicated to the horse. A horse under such conditions seldom jumps well. Before his turn comes to jump the rider should get on his horse and give him a good canter round in order to get him fully awake and warmed up. He should then dismount and not mount again until just before he is due to go into the ring to jump.

(g) Before starting to approach an exceptionally large, or difficult jump, such as a double oxer, it is often a good plan to give the horse a tap on the shoulder with the stick. The horse quickly gets to recognize that this is a signal that an extra effort is required, and approaches the jump accordingly.

(h) The rider who is unlucky enough to have a refusal in the ring should not risk having another one, and should always let his horse have a good look at the fence before presenting him at it again. Punishment should not be given in the ring. Failure in public must be remedied later on the schooling ground.

In conclusion it may be said that, as in every other game and sport, the rules, and also the system of marking, must be carefully studied. The rider should note, to quote but one instance not always understood, that if on refusing the horse knocks the jump down it counts one fault, unless the horse's hind legs cross the line of the jump, in which case it counts four faults. Knowledge of the rules is easily gained and may save much disappointment.

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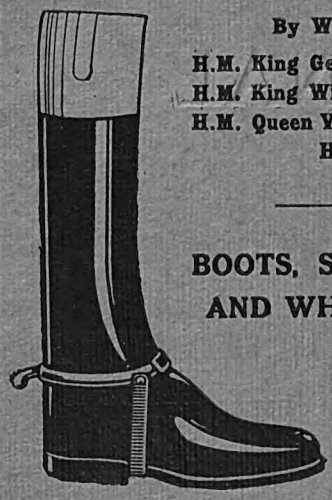

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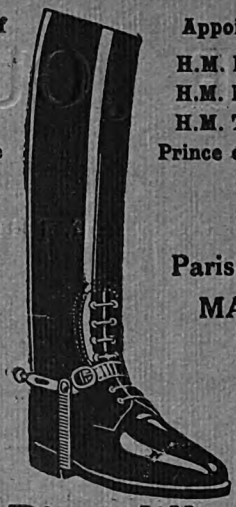

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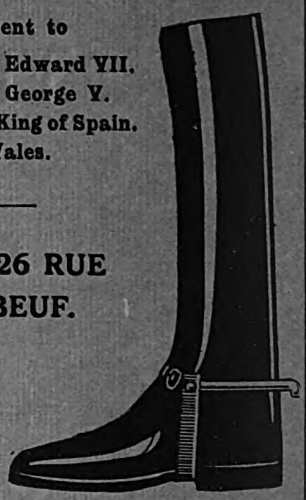

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A Madras Horse Artillery Officer.

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"DUNCAN" COMMENDED ESSAY, 1929-1930.

"Discuss the effect of the introduction of Radio-Telephony between O.P. and guns on the Equipment, Organization and Employment of Artillery."

BY LIEUT.-COLONEL M. R. STROVER, D.S.O., R.A.

"ARMA VIRUMQUE CANO."

IN a long, warm, bath after a hard day's exercise some of one's brightest thoughts come bubbling to the surface. Inventors, I am told, have especially luxurious bath rooms. Napoleon is said to have thought out his most ambitious schemes in the luxury of hot water and incidentally to have rather let his dreams run away with him. Following the example of such great men we climbed into a tepid bath one evening after a grand hunt and turned on the hot tap until the temperature reached the point of inspiration. We firmly assured ourselves, however, that we would finish up with a cold sponge and not let our dreams run away with *us*.

LONG RANGE HEAVY GUNS.

Soon we began to grow dreamy and the dream-theme was the effect of the introduction of radio-telephony between O.P. and guns. As we lay playing with a large sponge and inhaling the aromatic scent of bath salts a vision arose of an army moving towards an enemy equipped in much the same fashion as itself. Dimly we saw a division moving in three colums each with its own advance guard, other divisions to right and left, cavalry away to the front, dimly, because we were a long way behind them all. Near by, surrounding a goodly area, were A/A guns in large numbers ready to keep at a distance no matter what sized formation of enemy aircraft. Evidently this was a very important area, so we probed around to discover more. Here and there, in the best available cover, hidden under very clever camouflage, we began to pick out batteries of big calibre guns, groups of lorries, an important headquarters, piles of stores, ammunition and what not. We

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drifted over to a battery to discover some details and found large guns on central-pivot mountings elevated to high angles and firing almost over each other's heads.

The officer in charge peeped at us out of his lorry and invited us in. We stepped up by the driver's seat and went into not one lorry but four with their tails touching and a platform for easy communication. No beds, no luxuries, obviously only occupied by those awake and on duty but still very full and fearfully busy. The lorries were fitted with tables and forms, map boards, telephones, etc., and the sides were covered with gadgets which we did not understand. It all seemed far too valuable and complicated for war but the officer assured us that he considered he was safer where he was than in any large town in England. "You see," he explained, "apart from the fact that the enemy have to discover us we are beyond the range of enemy guns, we are very well protected from enemy aircraft and what else can touch us." He told us he could get his guns on the move at quite short notice and travel at an average speed of 20 m.p.h. His next position was all prepared for him and when headquarters moved forward guns, A/A, lorries, etc., would dart forward under the protection of the R.A.F. and settle quickly in their new surroundings ready to fire again at very short notice. "That of course is one of the advantages of survey," said he. "We take a great deal of work off horse artillery, and divisional artillery of all sorts is saved during the approach march. The cavalry love us and say they never get held up long now they can meet opposition with a few big shell. The force commander is always in close touch with us." "Isn't it rather dangerous?" we asked, "to support cavalry from such a distance. One would have thought that if they are doing their job thoroughly they would scarcely have time to resect their position accurately and are as likely as not to be hit by their own shell." Our friend explained however that on such occasions, both in support of cavalry or of infantry exploiting a success, their first rounds consisted of noise and black smoke and were burst high in the air until they fell near enough to the target to use ordinary shell. Once ranging was completed the map-co-ordinates of the target were worked out at the battery and reported to the F.O.O.

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But these gadgets on the side of the lorry were intriguing and we wanted to know more about them. Apparently one lorry was given up entirely to radio-telephony and a large radio exchange was fitted up. Fortunately he did not attempt to explain technical details of how it worked but there it was. Every now and then a light glowed and the R/telephonist talked to someone. While we were watching a blue light appeared on the board. The officer dashed over to take a message, started his staff working and telephoned orders to the guns. We looked out and saw them turn and fire far to the flank. Ranging continued for a time while men in the next lorry, a survey lorry, were busy with calculations. Later the officer came back and told us that for the moment their front was quiet. The division on the right was in action and he had just been helping them to fix points in enemy country ready for an attack. That blue light, he explained, was produced by a special radio message that could be taken up at once by all units. The correct wave-length was discovered almost immediately and the battery tuned in to take messages from the F.O.O. on the front where they were required.

Strolling into another lorry we saw, on a screen, a picture of the front where the attack was just going in. Someone was talking by R/T and explaining just where flanking fire was needed. *Television*, we were told—we could see all that the F.O.O. could see including a party of machine gunners not far in front of him making their final preparations to support the attack. We watched it with amazement. Then the attack began and the picture became too blurred with smoke to be interesting. Guns were firing now from many other batteries round us. Shell seemed to be transferred direct from lorry to gun by some convenient method which we could not see. As soon as one lorry emptied it was taken off to refill at the dump and another took its place. There seemed to be no work for the lusty gunner with the 3rd Class Education Certificate wangled with so much difficulty. All heavy work was mechanized and the staff lorries were full of intellectuals. We wondered where so many highly-educated men were to be found in the army. A slight chill reminded us that we were reverting to practical thoughts and we turned on the hot tap for a spell.

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Light Artillery.

Our newly-acquired friends dimmed and faded away. While we were wondering vaguely if these guns were all that the division possessed, we became aware of another part of the front more noisy and evidently far more dangerous. Enemy shell were bursting unpleasantly near the position. Reminding ourselves firmly that it was a dream and that there was no real risk, we sauntered into the battery position to have a talk. The G.P.O. popped his head up from a hole in the ground and greeted us with a cheery smile, then popped down again to give an order. When the firing stopped and he gave "stand easy," his detachments bolted for trenches. We were invited into his dug-out. He was a *close-support* battery for the vanguard, he told us, but he had practically reached the limit of his range and another battery from the head of the main body was taking up the running until he had moved forward again. "But how do you find time to dig in so successfully in an ordinary day's moving battle?" we heard ourselves say. He was busy talking by R/T to his brigade commander who was forward at another battery headquarters. The lorries and tractors were driving up. He pointed under one close to us and showed a mechanical digger which, apparently, did all the spade work in a very short time. We wanted to bombard him with a string of questions but he was gone and the guns with him.

Observation.

We began to think of the old days in France struggling to see what we wanted from an O.P. or keeping up with the infantry and seeing marvellous targets, but with never a hope of getting any message back to the battery—a company commander wants assistance, machine guns are holding him up, we can both see roughly where they are firing from, but we cannot see the machine gun. If only we could be transported to that high ground a mile away and have communication with a battery on that flank we could see the machine gun and shoot into it as well. But there is not a hope of getting communications through in time and the company could never wait long enough. "We could do it at once if we had R/T," we say, "only have to think of a thing and it happens."—

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We let a little water out of the bath, turned on the hot tap again, and stirred round with the large sponge until the warmth reached our shoulders. Feet were getting nicely boiled.—"Battery calling," says the telephonist walking beside me, "wants you to observe their fire on machine-guns in the area of the division next to us." Map square is given and in five minutes the battery in the next division will burst a "coal box" over the place where the machine-guns are supposed to be.—This of course is exactly what we want done for our company commander. The G.P.O. is spoken to and he arranges all details to carry out our suggestion after he has swung round a flank gun to shoot in the next division's front.

"This is all very marvellous," we say to our telephonist. "Can we talk to everyone all along the front?" "No Sir, not now," he answers. "You remember we could when we first came out, but they stopped all that while you were in hospital, all the F.O.O's wanted to talk to each other by R/T, batteries from all along the front, forward and back, wanted jobs done, broadcast messages floated in from every direction and no one could ever do any useful work. You were lucky to get a 'blighty' before it got so bad. But now the F.O.O. can only talk with his own battery until he is given a special wave-length to tune into. All the difficult part is done in the battery position and is really worked out on the R/T exchange board."

The Brigade Commander.

The bath was beginning to grow cold, and it seemed time to get out, but it needed an effort and still we stayed in and mused. Inspiration began to fade with the lowering of the temperature. Practical considerations began to creep in and spoil the dream. The face of a well-known brigade commander appeared in the picture and our mind lept to him full of eager questions. He was having a quiet spell and was quite ready to talk. "As far as we can see," we said, "you don't seem to figure very largely in this war where battery talks to O.P. by R/T and you still struggle along with the antiquated telephone." "Well," said he, "at first it certainly did look as if colonels were to be treated with the consideration their years entitled them to. It seemed as if their only duties would be to hob-nob with the infantry commanders and give

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their opinion from the artillery point of view. No one would take serious notice of their advice and the war would not be affected even if their opinions were unsound. But unfortunately this turned out to be quite wrong. Some enthusiast discovered that batteries, freed from problems of communication, could herd together in a comparatively small space where telephonic communication with brigade headquarters was too easy to mistrust. The result has been that brigade headquarters is now always located alongside the radio exchange of one of its batteries, and there is scarcely a dull moment all day.

Not only are the old problems tackled with the advantage of R/T to help, but nowadays one is continually called upon for such extras as enfilade fire on the front of another division, shoots on machine guns on other fronts, supporting tank attacks with observation from the tanks themselves, engaging tanks from any direction with indirect fire, registering points for the survey people. Something all day and quite a lot to do at night as well. You see, the trouble is that now we can switch from one O.P. to another so easily we are in constant demand from any front within our reach. Our C.R.A. is never content with the support given by one artillery brigade to its own infantry. He knows he can easily drag in his other brigades and one is never free from the chance of a call for a short concentration on this, that or the other. The infantry demand far more accuracy now that they know we can get observation on most of their front from several different places and can shoot on targets that are really worth while. Also, now that we can fix our targets so accurately with a combination of shooting and survey, we are expected to hit things instead of plastering a locality. In a way ammunition expenditure is reduced, as, undoubtedly, this support from the flanks is more effective than lengthy bombardments from guns on the immediate front of the attack, but we would never have been able to meet our demands for fire if ammunition supply by airship had not been introduced. Now we know that as soon as it gets dark we will get a fresh supply no matter how blocked the roads may be.

Our salvation is in the big guns which take a great deal of work off our immediate front and let us concentrate more on helping infantry on our flanks. We are shelled a good deal, as counter-

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battery staffs have discovered how to fix enemy battery positions by cross observation on radio-waves. It is all getting too scientific for the ordinary going, pre-war, hearty individual. More education is the constant cry and it is getting more urgent every day. At the same time there is even more scope than before for bravery and dash in O.P. work. Now that observation takes the place of calculated barrages and guess-work concentrations, F.O.O. work is too responsible a job to be left to junior officers. The observation party for the brigade contains a major and a captain in addition to such subalterns as are necessary, and it is perfectly astounding how they manage to get about, keep in touch with the infantry, carry out ranging, etc. Their little armoured vehicles take them up to a point with comparative safety but there is usually a fairly long carry before the instruments can be dumped within reasonable reach of the F.O.O. The type we need now is a pre-war soldier with a post-war education and we could never have got it if we had not lowered the age of enlistment and taken some of our men straight from school. Now that we have bridged that gap of three years without education the men reach astonishing heights of ability and many of our gunners, in their own special line, are as good at calculations as the officers."

We asked him if howitzers had gone out of favour completely with the introduction of R/T. "No," he said, "R/T came in just in time to save vast expenditure on howitzers to the exclusion of guns in divisional artillery. Now, of course, we have no need to push guns close up to the front where crest clearance is difficult. Also we do a great deal of enfilade fire where shrapnel must be used. At first the cry was to do away entirely with howitzers and to revert to early days of guns only. But now that the four batteries of the brigade are always herded together, it is not always easy to find suitable positions for guns only. Also the advantages of the big bursting charge and steep angle of descent remain. After many changes the final decision is to have two batteries of guns and two of howitzers in each brigade. At present the brigade commander has to get all his R/T news from one of his batteries, but, as time goes on, he will undoubtedly get a receiving set of his own, a R/T exchange and eventually a sending set."

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CHANGES IN ORGANIZATION.

The bath water was really getting too chilly to be pleasant so, true to resolve, the cold tap was turned on firmly for a brief moment. We hopped out and proceeded to wrap ourselves in a large, warm, bath-towel and rub down vigorously. Exercise brought more practical thoughts. As we dressed and hummed an ancient tune, we tried to piece together our dreamings and see what changes would be involved if ever they materialized:—

1. Long-range guns moving at rare intervals and covering a vast front.
2. More big guns.
3. Increased popularity of guns as opposed to howitzers in divisional artillery.
4. Disappearance of close support artillery.
5. Increased demands on senior observation officers.
6. Fire more concentrated under brigade control.
7. Increased value of survey.
8. More educated soldiery.
9. Formation of areas protected from enemy aircraft.
10. Improvements in ammunition supply.
11. Could we reduce the numbers of guns in a division? Yes, it would seem so, provided Corps kept a strong mechanized reserve ready to reinforce when and where required. On the march, this would help to keep the roads clear for infantry, ammunition, etc.
12. Could we reduce battery strength? Not by very much. We might save a few signallers, but we would have to increase the G.P.O's staff. A second officer or very good N.C.O. would be needed in the battery when switching off a section by itself. The signallers would have to be very highly trained.
13. How can we ever train our men in peace time, particularly at home, to the required standard of intelligence? Perhaps by earmarking whole brigades to supply drafts for India, Territorials, depot, courses, employments, etc., and, when they have exhausted their personnel, starting them afresh with raw material. Or by keeping two batteries in each brigade for this purpose. During the rebuilding process

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men would remain together for a sufficient number of years to learn their jobs efficiently.

EQUIPMENT.

What changes will we need in equipment?

(a) All round traverse to guns and howitzers.
(b) Better dial-sights to make it possible to do these vast switches with accuracy.
(c) A good type of bearing picket to replace aiming points.
(d) A height finder to fix the height of targets after registration.
(e) Better map boards and more of them.
(f) A convenient vehicle for the G.P.O. to use as a travelling office.
(g) A convenient vehicle in which to carry the R/T set and all that it involves.
(h) One or two armoured vehicles for the observation party.
(j) New types of ammunition when ranging for survey.
(k) The fullest development of all the possibilities of R/T.

As I was slipping into my overalls, I heard the trumpeters marching up to sound for dinner. Studs and buttons, collar and tie demanded instant concentration and my dreams faded away with the last soapy gurgle of the bath-water.

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THE MECHANIZED FIELD BATTERY.

A Regimental Officer's ideas on the problems of establishment of vehicles and organization of the Battery Staff.

BY MAJOR (BT. LT.-COL.) A. W. PURSER, O.B.E., M.C., R.A.

GENERAL CONSIDERATIONS.

Assumptions.

It is assumed that:—

1. The battery considered forms part of a brigade similar in its composition to a divisional artillery brigade.
2. That the functions of such a brigade are similar in all respects to those of a divisional artillery brigade, and that the heresy of a special role due to limitations imposed by being mechanized is not admitted.
3. That it is borne in mind that the object is to produce a unit which will function successfully under conditions of modern mobile warfare in a force of at least four divisions, as opposed to a single battery being put through its paces at practice camp.
4. That radio-telephony as a primary means of communication within the artillery has come to stay.
5. That it is possible in a mechanized unit for one man to combine the duties of a driver of a vehicle and (say) a signaller.

Types of vehicles.

There is a feeling abroad that the protracted experimental period that we have been going through should by now be nearing completion and that something in the way of artillery vehicles should be standardized, even if perfection, so seldom attainable in this world, has not been achieved. The alternatives can be broadly divided into two main categories:—

A. A specialized type of vehicle preferably whole track which, with slight modifications to body work, and perhaps in two sizes, would be suitable for all purposes in field artillery other than purely

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transport work. A very promising vehicle of this type has been produced and has come successfully through severe trials.

B. The adaptation of six-wheeled or half-track chassis of suitable power. There are many of these already in use in the service for load-carrying purposes but they do not appear to be capable of achieving a sufficiently high standard of draught performance.

There are many arguments for and against each type and it is not proposed in this paper to enter into these in any great detail. Suffice it to say that the following points have not been lost sight of:—

(a) Necessity for economy in road space—i.e., number of vehicles, for in mechanized units it is of course the distances between vehicles rather than actual size that take up road space.
(b) Desirability of the reduction of numbers of types of vehicle throughout the service.
(c) Replacement of casualties, provision of spare parts and expansion for war.
(d) Simplification of the maintenance problems within the unit. At present this problem is very far from being simple.
(e) Necessity for flexibility particularly in the battery staff.
(f) The reduction of height.
(g) Cross country performance.
(h) Availability and ease of replenishment of ammunition in battery echelons.

After much consideration the conclusion is reached that the adoption of "Alternative A" above gives the best chance of approximating to the ideal. It is assumed that a chassis of the whole track type can be adapted for many other purposes than a purely field artillery machine, such as machine gun or trench mortar carriers, light tanks, anti-tank gun tractors, etc. In view of the well-known objection to whole-track machines from the point of view of wear of tracks it is as well to state at once that it is understood that this objection has been to a great extent overcome in the latest type of track.

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Let us now examine in detail how a chassis of this type can be made to fit the requirements of field artillery considering first the battery less staff and later the battery staff as a whole.

Battery Vehicles.

Present establishment.

A.F. G.1098 issued January, 1930, allows for the following:—

Tractors (type to be decided)	6	
Lorries, light, six-wheel, for ammunition	12	(15 for 4·5 How.)
Motor van for officers' mess and office ...	1	
Kitchen travelling mechanical	1	
Trailer water tank	1	
R.A.S.C., attached.		
Lorries, light, for supplies	2	
,, ,, ,, baggage	1	

Between tractor and gun is interposed in the case of the 18 pr. an adapted wagon limber, and in the case of the 4·5 how., a wagon body. The miscellaneous vehicles in the above list, i.e., all except the tractors and lorries for ammunition, do not call for much comment. The "kitchen travelling mechanical" and "trailer water tank"—even though it is not clear what the trailing agent is for the latter—will both receive a cordial welcome when they put in an appearance and we are enabled to give our men well-cooked hot meals at reasonable intervals. The motor van should prove sufficient provided always that the "office" is not too big.

Requirements.

The firing battery and ammunition lorries, however, call for a little more comment. In and on these vehicles accommodation has to be found for 176 rounds of ammunition (132 in the case of 4·5 hows.) less what is carried in the limber, or its equivalent, and for all the battery personnel other than those carried in staff vehicles. The approximate figures for the personnel are 115 and 125 for 18 prs., and 4·5 hows., respectively, allowing 33 in each case for staff and "extras". To simplify the question we can confine our attention to an 18 pr. battery, it being understood that similar figures exist for a 4·5 how. battery. It is assumed that every endeavour is made to maintain the relation between firing battery and first line as

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adopted in a horse-drawn battery. The distribution figures therefore become something like this :—

		Rounds.	*Men.*			*Rounds.*	*Men.*
Tractor	...	62	9			372	54
Limber	...	38	—			228	—
Lorry	...	38	5		×6=	228	30
Lorry	...	38	5			228	30
Total	...	176	19			1056	114

It may be assumed that the half-track tractor towards which the official pendulum seems at the moment to be swinging has the necessary power to carry the above load and pull the gun over reasonable ground. But one bullet in the radiator of the tractor will put it out of action and there are no spare tractors.

Suggested establishment.

Tractors (whole-track type) 18 (same for 4·5 how.). Miscellaneous—as before, i.e., no increase in the number of vehicles for an 18 pr. battery, and in the case of a 4·5 how. a direct saving of three vehicles. Towed by each tractor is a gun or wagon and limber. That is to say that the tractor absolutely replaces a six-horse team. Each tractor is capable of carrying six men—i.e., two drivers (one relief) and four working men of sorts. The distribution of ammunition and men is obvious. All the tractors are interchangeable, so that the case of a gun being put out of action by one bullet, as suggested above, should not arise. The simplification of maintenance within the unit need not be emphasized. The height of a man's head when seated in the vehicle is less than that of a gun wheel. The cross-country performance is beyond reproach. Capital cost in supply is believed to be less than in the case of any half-track machine capable of a similar performance.

The Battery Staff.

Before considering the type and number of vehicles required for the battery staff it is suggested that the time has come for consideration of the following question :—

> "Can the present organization of the battery staff be changed without affecting its working, and is it desirable so to change it?"

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Arguments.

1. *Rangetaker.*

It is suggested that this member of the battery staff was *re-introduced,* after an attempt had been made to do without him, for the two main reasons that :—

(a) The B.C.A., and horseholder, in a horsed unit, were already so overloaded that it was found impossible for them to carry the instrument and stand.

(b) Under practice camp conditions of speed, and with the zest for "silent registration" entailing the taking of so many ranges in a short space of time, it was urged, and agreed to, that the B.C.A., could not combine the two functions.

Of these (a) is not necessarily applicable to a mechanized unit.

As regards (b) one is moved to ask "are we working on the right lines for war? (See original assumption 3.) Practice camp O.P's differ very greatly from the real thing, generally being badly concealed and overcrowded. In war if speed is essential a very rough range will probably suffice, the guns doing the rest. If and when something in the nature of silent registration is required, and most certainly it will be required, far more time will be available than is usually allowed at practice camp. The fact of the same man taking angles and ranges to selected objects minimizes a very prevalent source of error, and his carrying out both operations practically without moving would surely minimize a very prevalent source of danger. The use of the rangetaker as a look-out man when not actually engaged in taking ranges is an important factor. But is this employment a primary reason for his inclusion in the O.P. party? Is it not rather something in the nature of an attempt to justify his presence there?

2. *N.C.O. i/c signallers.*

It is unusual for this member of the battery staff to be employed as an operator. Once he has established the communications he generally (at practice camp) drifts to the O.P., and swells the crowd there. If telephone communication breaks down he is more often than not, and particularly in a mechanized battery where he is usually one of the very few independently "mounted" men, sent along the line and degenerates into a linesman, the very Cinderella

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of the signalling personnel. The B.C. always gives definite orders as to the general means of communication to be employed and it is suggested that any qualified signaller can supervise the carrying out of these orders, but is there any valid reason why he should not eventually be employed as an operator? The improvement of radio-telephony will moreover continually tend to reduce the amount of supervision necessary, and it is suggested that the retention of the N.C.O. is to a certain extent a relic of the good old Army custom which decrees that if one man be set to sweep the road an N.C.O. must be detailed to stand and watch him do it—and probably be visited by the Orderly Sergeant.

3. *Surveyor.*

It can hardly be denied that the whole tendency of *true survey* within artillery fighting units points more and more to the necessity of its being organized on a brigade basis. Such "survey" work as is carried out within a battery must eventually, if it has not already, become the duty of battery officers assisted by N.C.O's or men other than the very highly trained surveyor. The survey personnel should be an integral part of brigade headquarters and, together with the officer in charge, be considered as brigade staff. It is surely certain that, whatever the limitations imposed by "finance" in peace, in war (and even at practice camp) the brigade commander would organize the party in this way.

4. *Groups of signallers.*

What is the very great advantage of organizing signallers in groups of *four* men? The system appears to entail a constant indulgence in the solution of the time-honoured puzzle of the fox, the goose and the bag of corn, in order to arrive eventually at the ideal conditions of two operators who bear the mystic labels A1 and A2 working with their fellows who are called A3 and A4. Why in the name of common sense "A1 and A2" should not occasionally work harmoniously with "B1 and B2" it is difficult to understand. The more or less permanent retention of signallers in *pairs* may have advantages, though, with the advent of radio-telephony, pairs may often have to be broken to enable, for instance, a F.O.O. to advance with one signaller, but a slavish adherence to groups of four men needs, it is submitted, considerable justification.

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Can it possibly be that the labels A1, B1, etc., are merely retained to facilitate explanation of the various evolutions? Surely for this purpose numbers, as in a gun detachment, would suffice.

On the other hand the question of personnel for cable maintenance is one that is worthy of consideration. It is suggested that the employment of skilled signallers on this duty does not fulfil the principle of economy of materiel. Furthermore the present tendency is veering towards pooling the resources of two or more batteries for the purpose of maintaining at least one main line of communication where it is necessary for such to be established by telephone. Even when resources are so pooled it is likely that on the battlefield of the future the men concerned with the maintenance of wires will be kept even more busy than they have been in the past.

It is proposed therefore to include in the battery staff a small "cable maintenance" party. Such men need not be signallers—merely reasonably efficient telephonists; they must be trained to recognize the best available detailed route for a wire once the general route has been indicated to them. Their equipment need only consist of the necessary means for listening in, burying cable and making temporary overhead crossings.

5. *Orderlies or despatch riders.*

The provision of these is often treated very generally in the various manuals, it being left to the ingenuity of a battery, or other unit, commander to detach such mounted men as are necessary and he can spare. In a mechanized battery odd "mounted" men do not exist, and yet many brigade commanders will automatically call for "one D.R. from each battery". This is probably largely the result of ingrained habit and also of the fact that the establishment of a brigade signal section only allows for one motor-cyclist D.R. The former is a matter of education, if the term can be allowed, but the latter is closely related to the subject of this paper. It is urged that in addition to the signal section D.R., brigade H.Q. should be increased by two motor-cycle orderlies whose primary, if not sole use should be for communication within the brigade. Two such men could easily carry out the duties of the four mounted orderlies that used to be detached from batteries and their permanent in-

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clusion in brigade H.Q. would absolve batteries from extemporizing personnel for duties which admittedly do exist. Within the battery itself the need for mobile orderlies constantly arises both on the march and during reconnaissance as well as, though possibly to a less extent, when in action. It is suggested that two is the minimum number required.

6. *R.A.F. W/T Personnel.*

These are liable to be attached, with their instruments, to any battery at any time. Provision must therefore be made within the firing battery, though not necessarily in the staff, for the carriage of two men, their instruments and kits.

Conclusion.

From consideration of the above it is urged that the answer to both portions of the question asked at the beginning of this section is "in the affirmative". On a more detailed reply being asked for the following is offered :—

1. The composition of the battery staff must be considered in conjunction with that of the brigade staff.
2. Both can be modified to a certain extent to meet practical requirements and facilitate their distribution in suitable mechanized vehicles.

As one of the primary objects of this paper is consideration of the battery staff suffice it to say, as far as the brigade staff is concerned, that its present establishment should be increased by the following personnel :—

Survey party	... ...	1 officer, 8 other ranks.
Despatch riders	... ...	2 other ranks.

As regards vehicles for the above the survey officer requires a small car. The remainder of the party require at least one vehicle capable of carrying them with all necessary stores, or preferably two of the larger cars advocated below for the battery staff. The despatch riders are found by experience to be most suitably mounted on solo motor-cycles.

Suggested composition.

The following is offered as a reasonable composition of the battery staff to meet all normal requirements :—

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	Officers.	*O. Ranks.*
B.C. G.P.O.	2	—
B.C.A. G.P.O.A.	—	2
Signallers	—	10
Linesmen (cable maintenance) ...	—	4
Orderlies	—	2
B.S.M.	—	1
Captain	1	—
B.Q.M.S.	—	1
*Battery Leader (temporary) ...	1	—
*R.A.F. for W/T (temporary) ...	—	2
Maximum ...	4	22
*Minimum ...	3	20

These figures are exclusive of any necessary drivers which will be considered in connection with the vehicles. To the above must be added the many and varied stores including at least two, more probably three, radio-telephony sets and an observation ladder.

A further incidental point which may conveniently be mentioned here is that of the provision of telephone wire. Under present conditions of difficulty of replenishment much time of battery personnel is taken up in picking up wire and then endeavouring to rejoin the battery. More often than not the detachment of such personnel, owing to the lack of sufficient means of transport, has temporarily disorganized some portion of the battery. It is strongly urged that the time has come when the supply of wire should be automatic from rear to front and obtainable by fighting units at short notice on indent. The organization of salvage parties, preferably forming part of divisional signals, should not be a difficult or expensive matter. The salvaged wire would be overhauled at divisional signals and thence issued to units as indented for.

Battery Staff Vehicles.

Present establishment.

The figures given in A.F. G.1098 for these are as follows:—

Motor cycles	6	
Cars six-wheeled or semi-track	3	
Carriers armoured artillery for Battery Commander	1	(Type to be decided)

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The above must be considered as modified by the exchange of three motor-cycles (combinations) for three Austin Seven two-seaters, and it is foreshadowed that 100 per cent. conversion will eventually take place. The Austin Seven two-seaters will carry two men over practically any ground but are incapable of carrying a third man or any appreciable amount of kit. They are not fitted for laying telephone wire and it is doubtful whether they could be so fitted.

The cars six-wheeled as issued will carry seven men in addition to the driver and practically any amount of kit including the R/T set in a very satisfactorily sprung compartment. The cars semi-track so far seen will carry six men (barely) in addition to the driver, a limited quantity of equipment, and have no compartment offering accommodation for the R/T set. Furthermore the carriage of the men's coats and blankets is not satisfactorily legislated for. Both types are fitted for laying (and picking up) telephone wire in a satisfactory manner. The "carrier armoured" not having materialized no comment is offered.

The establishment permits of various solutions of the straightforward problems of reconnoitring and occupying a position either in advance or in retirement and of establishing and maintaining the necessary communications. A certain amount of interchange of personnel between vehicles has to be resorted to especially if it becomes a question of reeling in a long telephone wire, but a definite drill can be laid down and, generally speaking, adhered to.

It is however when a battery is called upon to detach a section or send forward a F.O.O., that the lack of flexibility inherent in this establishment is really felt. Take what is really the more common and simpler operation of the two—i.e., sending forward a F.O.O. He must of course have the necessary means of communication available so he is compelled to take one of the cars six-wheeled (or semi-track). Even allowing for the fact that the present type of six-wheeler can be reduced in height by eight inches or slightly more it is an unwieldy sort of beast for a F.O.O. to be tied to and a most unwelcome neighbour in the areas in which such officers may be called upon to operate. Further its useful load of nine is largely in excess of the two signallers that, with R/T available, will be sufficient for the F.O.O. What is to happen to

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the remainder of the men normally carried in the vehicle? It is maintained that what should be a very simple operation will considerably disorganize most of the staffs of mechanized batteries who have so far attempted to carry it out. The whole difficulty may be summed up in the words "lack of flexibility".

General requirements.

In general terms the requirements may be stated as :—

> *The smallest number of vehicles of as few types as possible which will permit of the flexibility of the staff of a mechanized battery approximating to that of a horsed battery.*

The word "approximating" is deliberately used because the absolute flexibility if "one man one horse" can never be attained without having recourse to an inordinately large number of small cars.

Before considering definite types of vehicle there is one minor point as regards general equipment which may well be mentioned here. In all vehicles issued up to date an attempt has been made to provide all-weather protection. When this equipment is in position it has resulted in poor protection, but has provided a very efficient handicap to the activities of the occupants. It is not seen how anything in the nature of the usual hood and side curtains can fail to suffer under this disadvantage, and anything in the nature of a permanent top is very strongly to be deprecated if only because of the consequent increased height of the vehicle. It is suggested that beyond some form of windscreen the man in a car needs no more protection than the man on a horse or limber.

As regards types of vehicles it is suggested that the field of selection is practically narrowed down to :—

A. A small car of the Austin Seven type which admittedly can only carry two men and a small amount of kit. If the driver of such a car is not an "operator" as well its useful load is reduced to one man and the kit. If the driver is also an operator it must be accepted that more often than not the car will remain comparatively close to the scene of the activities of its occupants.

B. A larger type of vehicle which will transport some four or five operators, their technical equipment and personal kit.

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C. A solo motor-cycle for such personnel as it is essential should be independently mounted.

Detailed requirements.

Type A. The Austin Seven as a carrier of two men with practically no technical equipment has proved its capabilities. An improved type of suspension such as is now being tried might be incorporated with advantage.

Type B. The following proposal is now put forward. A whole-track chassis similar in all respects to the chassis of the proposed gun tractor. On this chassis is mounted a low body with accommodation for a driver (possibly two) and five men. Body to be fitted with :—

Cable laying apparatus.

Container for (say) six reels of wire.

Specially sprung container for R/T set. This to be suitable, or capable of conversion, for carriage of W/T set as used by R.A.F. attached for co-operation. If possible the W/T set should be capable of receiving signals on the move. The present six-wheeler is most satisfactory in this respect.

In conjunction with this vehicle and towed by it, two store wagons to be issued, one for the O.P., the other for the battery position. Something of the nature of a limber is visualized in which can be carried all stores not carried in the whole-track vehicle. In fact a modified form of the vehicle recently tried with horsed units.

Type C. A "Colonial model" two-stroke motor-cycle is advocated in preference to the present machine. The type suggested should be quite fast enough for all requirements and is easier to manhandle and also to maintain.

Suggested establishment

The suggested establishment is perhaps best set out in tabular form with reference to the above three types of vehicle.

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Vehicle.	*Personnel.*	*Notes.*
A. No. 1	B.C., B.C.A.	
C. No. 1	B.C's orderly.	
B. No. 1	Driver, 3 signallers	Tows O.P. store cart.
B. No. 2	Driver, G.P.O., G.P.O.A., 3 signallers	Tows battery store cart.
A. No. 2	B.S.M., B.L.*	
B. No. 3	Driver, 3 signallers.	The B.C. will often want the G.P.O. in his pocket. In that case the G.P.O. rides in A.1, the B.C.A transferring to B.1.
A. No. 3	Captain, B.Q.M.S.	
B. No. 4	Driver, 1 signaller, 2 R.A.F. for W/T.	
A. No. 4	2 linesmen.	
A. No. 5	2 linesmen.	
C. No. 2	Spare orderly.	* Temporary.

Totals—A. Type. 5 an increase of 2.
B. Type. 4 ,, ,, ,, 1.
C. Type. 2 a decrease of 1.

General explanatory notes on above establishment.

A. Type Nos. 4 and 5. This increase is of course due to the inclusion of the linesmen who may perhaps be classed as somewhat of a luxury. The vehicles themselves, however, form a very valuable reserve and it is urged that such a reserve is necessary.

As regards the B type vehicles it is admitted that in only one case (B.2) is the suggested seating capacity fully utilized, but the spare seats afford the necessary scope for "telescoping" when necessary and there is a potential reserve of at any rate one vehicle.

B. No. 3 forms a convenient vehicle for detached work. What may at first sight appear the somewhat peculiar arrangement of signallers is based on experience with radio-telephony sets as at present issued. At the O.P. it is more often than not undesirable to have the set itself on the spot. It is generally more conveniently placed some distance away, the "remote control" being utilized. This lay-out entails one man at the set and two at the remote control. At the battery, on the other hand, the set itself and two operators can generally be at the command post. This leaves the third operator for the brigade wire in conjunction with the one carried on B.4.

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Various "permutations and combinations" of means of communication can be postulated but it is suggested that with seven signallers and one mobile pair of linesmen distributed between O.P., battery and battery end of brigade line, these three points can be kept in communication by one means or another.

It is not proposed in this paper to go into the detailed procedure for the various evolutions a battery staff may be called upon to perform. In principle, however, it is urged that an establishment of this sort would tend towards doing away with the present lack of elasticity without increasing the official establishment to an undue extent, and that the number of types of vehicle in the front echelon of a battery being reduced to three will greatly simplify the problem of maintenance from the point of view both of battery personnel and supply services.

CONCLUSION.

The proposed establishment may be summarized as follows :—

	War.	*Peace.*	
Guns and limbers ...	6	4	
Wagons and limbers ...	12	4 (*a*)	(*a*) possibly 8.
Tractors	18	8 (*b*)	(*b*) possibly 12
Small staff cars ...	5	5	
Large staff cars ...	4	4	
Motorcycles	2	2	
Motor van	1	1	
Kitchen	1	1 (*c*)	(*c*) Manœuvres.
Trailer water tank ...	1	1 (*c*)	(*c*) do.
3-ton lorry	—	1 (*d*)	(*d*) For general fatigues.
R.A.S.C., attached.			
Lorries for supplies ...	2	2	
Lorries for baggage ...	1	1	

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SURVEY AND BRIGADE CONCENTRATIONS.

By Major F. H. N. Davidson, D.S.O., M.C., R.A. *p,s.c.*

Introduction.

THE problem of concentrating artillery fire is one which, at the moment, is the subject of much controversy among the officers of the Regiment. This is largely owing to the fact that the adoption of survey methods by the artillery has made it possible for a brigade commander to control the fire of his brigade as a single unit, and to put down brigade concentrations on any part of his front soon after his batteries are committed to action. The problem of how to concentrate artillery fire at the right time and place is an old one, and in the past its correct solution has often had a decisive effect on battles. Napoleon realized its importance, and in many of his great battles the concentration of his guns into huge batteries contributed decisively towards success. Though such methods as he employed are now unsuitable, the solution of the problem is clearly as important as ever, especially in mobile operations, with which this article deals.

The development of brigade concentrations has caused a break in the deep-rooted tradition that the battery is the proper, and in fact the only efficient fire unit. A change of such importance is always treated with suspicion and dislike by the "diehard", who is quick to see the apparent drawbacks and defects of a new system. The fact that brigade concentrations, to be efficient, must be based on survey, further rouses the opposition of the reactionary, to whom survey is an anathema. Survey and brigade concentrations were the subject of much debate among the students at a battery commander's gunnery course, which the writer had the fortune to attend at the School of Artillery. Some officers with wide practical war experience were inclined to cavil at brigade concentrations and survey methods. They put forward the following arguments against these "new notions," particularly against brigade concentrations, viz. :—

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(i) The principle of economy of force is often broken.
(ii) An unnecessary waste of ammunition occurs.
(iii) Difficulties in communications make failure probable.
(iv) Both survey and brigade concentrations slow up fire terribly.
(v) The "divine right" of battery commanders is threatened.
(vi) The splendid results of battery-controlled fire during the early period of mobile operations in the Great War could not be improved on.

Before dealing with these criticisms it is suggested that much of the apparent hostility towards survey and brigade concentrations is due to the fact that, being "new toys," they were last year apt to be given undue prominence, especially at practice camps. This is, however, a feature of all new systems, and is necessary in order that they may be given a thorough trial as soon as possible, and explains the fact that, on occasions, brigade concentrations are now ordered for practice or trial purposes, when tactical considerations would, in the opinion of some officers, apparently not demand the use of the whole brigade. Further, the words "brigade concentration" give an impression of concentrating the fire of a whole brigade onto a point or a small area, with the obvious violation of economy of force. This is not so, and it is suggested that the term "brigade fire control" would be a more exact and suitable term to employ, and would convey more clearly the objects and methods of the system.

Economy of force.

It must be clearly understood that a brigade concentration does not mean a concentration of all four batteries of a brigade onto a target irrespective of its size or importance. It does mean, however, that a brigade commander having been given a target to engage, and having decided that more than one battery is required to engage it, sub-allots the portions of the target to be engaged by each battery, and orders the ranging and fire control of these batteries to be carried out normally by a special officer from a definite observation post. Let us take examples :—

With an 18 pr. battery it may be assumed that a H.E. shell can cover a front of 25 yards and a six-gun battery (with lines parallel)

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a front of 125 yards. Taking 2500—5500 yards as the normal limits of range for a brigade concentration, we find from a study of the range tables that 95% of the shells fired within the above ranges will fall in areas whose depths are roughly 60 and 120 yards at 2500 and 5500 yards respectively. Without splitting hairs one can thus with fairness state that 95% of a battery's shells will fall in an area whose average size is 125 yards by 90 yards, or roughly the size of a football field. Now a battery can fire at four to six rounds per gun per minute with ease for almost indefinite periods. It would seem fair to estimate that 24 rounds H.E. per minute (four rounds per gun per minute) on a football field would produce an effective concentration, at any rate in mobile operations when the enemy can only have at most partly dug field defences. If necessary this volume of fire could be increased to 36 rounds per minute (six rounds per gun per minute), which should be the maximum fire needed, and well within the power of one battery.

Further an 18 pr. battery can fire without undue strain at eight rounds per gun per minute for five to ten minutes. Thus a target up to 200 yards in breadth and 90 yards in depth can be dealt with by one battery for a limited period of time, by "sweeping." An artillery brigade commander faced with the problem of dealing with a target of this size would not in practice need to fire even a two-battery concentration unless the defences were so strong as to demand a greater volume of fire. Once this is is realized the objections to brigade concentrations, on the score of their being uneconomical, fall to the ground.

To consider the normal situation at the early stages of a battle :—Let us suppose that one battery of a brigade has come into action in support of the leading battalion which is held up by the fire of machine guns, etc., firing from an area or locality greater in extent than can be dealt with by one battery. The infantry brigadier decides to employ fresh troops to continue the operation and asks for a concentration on the offending locality. The artillery brigade commander decides it can be adequately dealt with by two batteries. A second battery is moved forward into action. Surely the quickest and best method of ensuring that the dangerous locality is thoroughly engaged, is to entrust the whole fire control to an observing officer (probably the battery commander) of the first battery, which

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has its O.P. and communications working, and whose B.C. already knows the ground. No one can reasonably cavil at such a system, which is economical in time, communication and officers, and efficient in effect. This is in full accord with Artillery Training, Volume II, which states that:—"The general principle should be to use no more guns than necessary."

Ammunition.

The enemies of brigade concentrations rightly state that ammunition supply in mobile warfare is strictly limited. Therefore they say that concentrations will have to be limited in their ammunition expenditure, and that the amount of ammunition required for ranging a brigade will eat up a large amount of the total ammunition available, whereas, with one battery, this would not be the case. The obvious flaw in this argument has been shown in the previous paragraph: i.e. that only such batteries (and ammunition) need be employed as are demanded by the tactical situation. Consider the case of a target 300 yards broad and under 100 yards in depth which has to be engaged for ten minutes. Let us assume that one round per ten seconds is required on each 25 yards of front. If engaged by one battery for ten minutes, fire would have to be at 12 rounds per gun per minute and 120 rounds per gun (or two-thirds of the whole battery echelons) would thus have to be expended. Apart from the likelihood of damage to the actual guns, it is surely better to ease the strain on gun detachments and ammunition by using two batteries, providing always the time factor permits a second battery being used. In any case the amount of ammunition required is fixed by the nature of the target and the time during which the concentration is needed. Whether the target is engaged by a brigade concentration or by four individual batteries clearly does not affect the ammunition expenditure—apart from the few rounds required for ranging.

Communications.

The critics stress the fact that brigade fire control necessitates complicated and numerous communications, which, they say, are more liable to interruption, than when each battery has the straightforward task of maintaining its one line to its O.P. They further

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point out that enemy shells and our own mechanized vehicles will surely cause breakdowns in communications, which will prove disastrous to this system. Let us examine the essential communications required for brigade fire control. There are in order of priority :—

(a) *Line from Brigade Control O.P. to Brigade Exchange.* In the common case when the O.P. of an Advanced Guard battery is used as brigade control O.P., this line already exists to the vicinity of brigade exchange. Normally this line will be the O.P. line of the battery whose O.P. is selected as control O.P.

(b) *Lines from Brigade exchange to all Battery positions.* There are many ways of aiding the security of these lines; to take simple cases :—

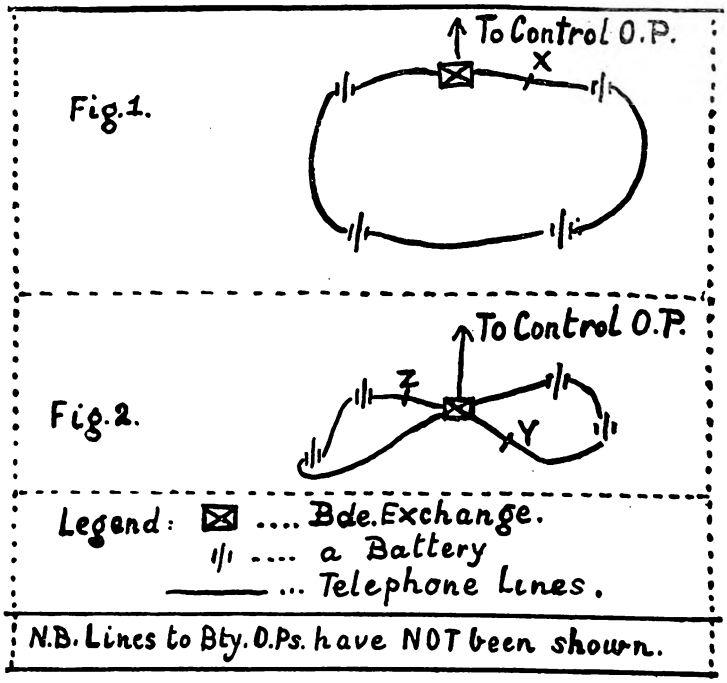

Fig. 1. If the line is cut at "X" the exchange can still get all batteries.

Fig. 2. If the line is cut at "Y" and "Z", the exchange can still get all batteries.

Further, the importance of simplifying survey by avoiding "legs" between a brigade bearing picket and batteries, will mean that batteries will not normally be very far apart in mobile offensive operations, when much distribution in depth is not essential. This will further shorten, strengthen and simplify brigade communica-

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tions, for battery positions will often be in mutual visual communication. We thus now only need to concentrate on the one line from the exchange to the control O.P., and on the lines round to the four batteries, who may only be some hundreds of yards apart. Each battery should be made responsible for one short inter-battery line which should be quite easily maintained, in view of the small distances involved. Further, in mobile warfare, the enemy will concentrate most of his artillery on the attacking infantry, and very little counter-battery fire may be expected. Mechanical vehicles too, may be persuaded by "line police" to make the very small detour necessary to avoid crossing the inter-battery wires. This system is, in fact, very much in accordance with the principle of concentrating on the main signal lines, which has been found so necessary with the limited signalling resources available. This must not be taken to mean that batteries will not lay lines to their own O.P's (or joint battery O.P's). The laying out of battery lines to O.P's is the first task of batteries, whose normal methods of fire control in mobile operations will be by observation from their own O.P's. The laying out of brigade communications as described above will of course proceed independently and simultaneously under the brigade signal officer, ready to meet the occasions when brigade fire control is necessary.

Now take the opposite case of four batteries each with their own O.P's—for each battery will normally require its own O.P. for ranging purposes, as the time factor will often preclude two batteries carrying out, from one O.P., the necessary ranging in time. In this case four times as much wire will be required than for the one line from brigade exchange to control O.P. Further, these four lines will traverse a much shelled area.

Surely the problem of keeping four batteries through to their O.P's really does present great difficulties. With four such lines it will not be possible to divert mechanized vehicles from crossing one or more of them. It will happen too, that, one or more battery's O.P. line may be cut so often that the battery will be unable to range in the short time available before the concentration has to be fired. If this is so, then there will be a gap, or a very thin belt, in the concentration, unless this battery is a superimposed battery. A battery finding itself out of touch with its O.P. might try to get

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another battery to range it, but unless the inter-battery communications are working on the system demanded for brigade concentrations, this battery cannot hope to get onto another O.P. and range in time. With the brigade control O.P. telephone system, as described above, the control officer will know if one battery is "dis," and, if time is short, he can order the necessary distribution to other batteries or fill the gap with a superimposed battery, increasing the rates of fire (if necessary after reference to the brigade commander). Thus the great risk of a gap in the concentration is avoided. Admittedly if communication with the control O.P. is continually broken a serious state of affairs may arise, as the brigade commander has put "all his eggs into one basket." On the other hand, by concentrating on this one O.P. line by means of duplicate lines, "laddering," and an alternative visual line, communication should be amply secure.

So far no reference has been made to radio telephony, which is already sufficiently developed to leave no doubt that it will provide a reliable and rapid link between the control O.P., the brigade exchange and batteries. Even if the difficulties of wavelengths limit the number of radio sets, so long as one pair of sets is available in an artillery brigade, they will bridge the vital and dangerous gap between brigade control O.P. and brigade exchange. The further transmission of orders to the guns can well be done by telephone.

Survey.

The critics of survey are apt to claim that it is slow, can seldom be used under mobile conditions of warfare, and that the "birds will have flown" ere the shells reach them. Further they say that survey has too many sources of error—miscalculations, phonetic errors, etc.—to be reliable.

It must not be forgotten that these premises are based on the experience of only a year or two, during which time personnel were seldom sufficiently trained and always inexperienced. With more training and experience speed and accuracy will certainly be enormously increased. It must also be remembered that to the rising generation "θ" has few of the terrors that appal those who in their youth have not had to take it seriously. It is even argued

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by some that logarithm tables and slide rules may be lost in the stress of battle. Every officer has a Part II Range Table, and if all these are lost, the unit must be a most indifferent one. In any case, spare tables, etc., could, in war if necessary, be carried by the B.C.A. and G.P.O.A., or in gun limbers.

The argument is even brought forward that survey does not produce surprise, as the enemy will expect to be fired at. The fallacy of this semi-truth is obvious. The whole point in survey is not just "firing at" the enemy, but in the ability to produce an accurate and overwhelming fire on an unsuspecting enemy, so that he is killed or rendered unable to use his arms at the vital moment when *you* choose to attack him.

As stated previously, the necessity for frequent testing and trying out survey at practice camps and on schemes, has probably ruffled the "diehard," who has naturally produced every conceivable objection to survey. In fact, even the broad-minded may have the feeling that artillery fire is sometimes made the servant of survey. One has often heard the remark made, when errors and delays occur in survey:—"This is all very clever, and good when it comes off, but if things so often go wrong in peace with highly trained regulars, what about war with a citizen army? etc. etc." If we examine in its simplest form the object of survey, it is solely to help artillery fire, and this mainly by producing data for a fighting map (1/20,000), from which ranges, angles of sight, switches, etc., can be obtained. If perfect 1/20,000 maps were always available and transport and distribution facilities admitted of an army carrying enough maps to provide all units on all occasions, then every gunner would be delighted. For many reasons this is not possible, we therefore have to work on the one-inch map for tactical purposes, at any rate as long as operations are mobile. The one-inch map is of little use for accurate shooting, and therefore batteries and brigades build up their own 1/20,000 fighting maps by survey, shooting, air photographs, etc. The result may not be perfect at the start, but it will be roughly three times as accurate as the one-inch map. In the search for the best available survey data to produce a quick and accurate fighting map, there has been evolved the accurate aeroplane strip map as one solution (1/20,000). No one calls this map a branch of survey, because it has

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no logarithms or θ. It is however a very definite survey method of the highest importance. Once then survey is looked upon as a means of producing an accurate "shooting map," all the objections of the reactionary vanish.

Further one is often apt to forget that a brigade or battery is not precluded from firing because it has no bearing picket or 1/20,000 fighting map. Fire by observation, or fire as a result of registration, will be the normal as well as the best method of supporting infantry in mobile warfare. Meanwhile batteries will be utilizing every round fired, and all other available data to build up "Survey" on their 1/20,000 fighting map. New targets can then be engaged as accurately as possible, and with a consequent saving of ammunition. Besides, in uncivilized countries maps are likely to contain little detail, in which case the brigade and battery fighting map will assume an additional importance. The quotation "I am monarch of all I survey" has indeed acquired a new meaning.

The fire plan.

The power of the defence, now that the number of automatic weapons has been increased in all armies, has been greatly augmented since 1914. It is even hazarded that the allotment of machine guns to battalions, and the resulting increased use of these weapons, has made the actual defensive fire power of a division greater than it was, even at the end of the last war, when attacks had to be supported by a vast deployment of artillery and, usually tanks. For this reason, great stress has rightly been laid on the importance of a fire plan in support of even the smallest infantry attack. Clearly any fire plan to be of any help must combine accuracy and density. In mobile operations the artillery available will normally only permit sufficient density of fire on a limited front. If this fire can come as a surprise it will add to the effect. The key-words of artillery support are in fact concentration, accuracy and surprise.

Without survey (including aeroplane-strip, or other 1/20,000 maps) will accuracy and surprise be possible? If each battery has to register its own part of the target surprise will be lost. Each battery O.P. may not be able to see the target really well, so accuracy must thereby suffer. By the use of brigade concentrations,

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assisted by survey, it is claimed that the maximum degree of accuracy, surprise and concentration of fire will result. In any case the Fire Plan has come to stay as a practical necessity, and the brigade concentration must be looked on as the first-born of the Fire Plan.

Brigade control.

It is argued, too, that the arrangements necessary to produce brigade concentrations seriously interfere with the battery commander's role of engaging targets. One officer complained that when he ordered "G.F. Target, etc.", to engage a platoon of enemy in the open, he was told to stand fast as the battery was to fire in a ranging round of brigade fire in 1½ minutes. The battery commander would, at first sight seem to have a legitimate grouse, but if he had actually accepted this reply in war he would have shown a complete absence of that initiative which should be inherent in every gunner officer. He should have told the G.P.O. to fire the concentration with four guns and report this to the control O.P. Meanwhile he should have engaged the platoon with one section and told the other guns to join into fire for effect as soon as possible.

Battery commanders must realize that, when a brigade is committed to the support of a formation, the general tactical control of that artillery brigade must be the responsibility of the brigade commander, who is, after all, in touch with the commander of the formation destined to carry out the operation. Whether a B.C. should divert the fire of part or all of his battery temporarily must depend on the target and the tactical situation. No battery commander could reasonably want to employ his battery to engage an enemy platoon, even in the open, if that battery was wanted for a concentration in support of an attack by our infantry. Again, a brigade commander by superimposing one or more batteries will always be in a position to switch a superimposed battery onto any emergency task, even while a brigade concentration is being fired in support of our infantry.

It is submitted that the artillery brigade should be looked on as a polo team, of which the brigade commander is non-playing captain and selector. The guns are the ponies and the officers are

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the players, though actually, in this brigade, the battery commanders are assumed to have the highest handicaps and thus normally form the brigade team. To our "diehard" B.C. his ponies (guns) are the apple of his eye. They are beautifully trained, they turn (switch), passage, rein back, etc. (search and sweep), play steadily in slow chukkers (zone and zero point registration), and quickly in fast chukkers (G.F. targets). They are sound, fit and beautifully groomed (guns clean, buffers full, etc.). The brigade commander enters his full brigade team for a big tournament (brigade concentration with four batteries) and decides that Major "X" whose eye is temporarily "out" (e.g. at an O.P. where observation is poor) had better not play (control the fire of his guns) and that Captain "Z" will play instead. What major would not be sad! He would not, however, grumble that captain "Z" had been chosen because of his own loss of "eye." Let us now assume that this open tournament has been successfully won, and that a subsequent low handicap tournament is to be played (smaller concentration). The brigade commander decides that Major "X" (whose eye is "in" again) and his battery shall represent the brigade, and enters it accordingly with the words: " 'X' has not quite enough ponies: I'll put the 191st battery's ponies at his disposal" (two-battery concentration). In these cases no one would think of criticizing the brigade commander. These examples have particular force in the Regiment, whose great success in recent open polo tournaments has been largely due to officers lending their own best private ponies. If individuals are prepared to lend their ponies, how can a battery commander moan and carp if his battery is lent temporarily to another officer for the common good.

Claims of 1914 methods.

The "laudatores temporis acti" who point to the wonderful results of battery-controlled fire during 1914, might be described as the crude participators in the vulgar artillery brawls in which easy targets of great depth and breadth were mown down by our powerful shrapnel. With the advent of masses of machine guns and light automatics such simple infantry targets may seldom again be presented. In any case large targets will normally only be available in the defence, when the enemy is attacking in force. In this case

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battery-controlled fire, and not brigade concentrations, is clearly the best method of engaging such targets.

Smoke is now part of the ammunition of all calibres, and an attacking enemy will certainly attempt to neutralize and blind the most prominent O.P. areas. Suppose that hostile smoke and other shelling has blinded or laid out three of the four battery O.P's of a brigade which, however, has its brigade communications laid out so as to meet the case of a brigade concentration. "A" battery's O.P. alone can see, and "A" battery is noticed as firing at a rapid rate: the other batteries are silent: heavy small-arm fire is heard. The brigade commander rings up "B," "C" and "D" batteries, who report that they are "dis" to their O.P's or that the O.P. cannot see anything because of the smoke. In a moment the brigade commander can order "Brigade Fire Control" to "A" battery's O.P., telling this O.P. and other batteries that each battery will revert to battery control when its own O.P. can function.

The capability of firing brigade concentrations does not preclude battery control of fire over battery zones. This latter system will often be the normal procedure, though the ability to produce brigade control will be of the greatest value, especially when battery control of a battery or batteries has broken down.

Disadvantages of brigade concentration.

It is only fair to consider certain apparent drawbacks in the system of brigade concentrations.

(a) *Surprise* is apt to be lost if brigades fire a round of gun fire from each battery at (say) thirty seconds interval as a standard drill. The arrival of three bursts of six 18 pr. shells and then six 4·5 howitzer shells will at once indicate to the enemy that an attack is due on the area shelled. Surprise would, however, be equally given away if four batteries individually ranged onto their own part of the target. If ranging of batteries is required before a brigade concentration, it should be possible, provided the guns are calibrated and survey data reasonably accurate, to postpone the round of brigade fire to just before zero hour, when the small final corrections could be made and the concentration begun at once. The enemy would thus be

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prevented from moving up reserves in time to make counter attacks. If the situation admits of predicted fire, then surprise will be complete and no ranging is needed.

(b) Clock code observations are sometimes very difficult to give accurately; on occasions there is a proved risk that a battery, or an observer, may make errors in the hour or circle, or even reverse the clock. With training and practice such errors should be avoidable.

Conclusion.

The foregoing attempts to portray fairly the question of survey and brigade concentrations (*alias* Fire Control). The great thing to realize is that these systems are still in their infancy in mobile operations, and are capable of great development, and that their sole object is to assist and improve the production of fire effect. They are the servants of the gunner, and must be used as such, i.e. only when their employment is advantageous in any given tactical situation. If new ideas are looked on in the proper light by every officer, they will be taken more calmly. The reactionary will drop his attitude of stubborn prejudice to new things and the visionary will be less prone to make fantastic claims for all things new.

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GUNS OR HOWITZERS?

By Captain C. A. P. Murison, M.C., *p.s.c.*, *p.a.c.*, R.A.

IN 1914 we were satisfied with three field guns to one field howitzer. To-day, though the fire-power of the infantry has been enormously increased, and though, in the tank, we possess a new assault arm, yet we still retain the same proportion of 18 prs. and 4·5 howitzers. Are we still satisfied with that proportion? Is there some mysterious spell attached to the three to one ratio, or do we cling to it because it is in fact the best for carrying out the artillery role, namely the immediate and effective support of the other arms? One rarely, if ever, hears anyone advocating an increase in the number of field guns at the expense of howitzers, so it is reasonable to assume that there are few if any arguments for such a change; there is, however, a considerable body of opinion that believes in the reverse. Why this popularity of the howitzer? Is it based on unfortunate experiences at practice camp with 18 pr. shrapnel? On wartime recollections of the howitzer battery tucked away in a ravine while its brother gun battery remained immodestly exposed because of some intractable crest? Or is it based on an appreciation of the needs of the other arms? In short, does the case for the howitzer rest on technical or tactical arguments?

The principal requirements of the field artillery weapon are well known—shell power, range, accuracy, long life, rapidity of fire, handiness in action, mobility and ease of concealment—and it is possible that if the gun and the howitzer are compared solely on the basis of these technical requirements, the balance of argument might be in favour of the howitzer. Certainly, with equal mobility and handiness in action, the howitzer is superior to the gun in shell power, life and ease of concealment. The gun has the advantage in range and rapidity of fire, and there is little to choose between them as regards accuracy. The gun can fire both shrapnel and high explosive; the 4·5 howitzer, on the other hand, is unsuitable for firing shrapnel. The ultimate decision as to choice of weapons must rest, however, not on technical advantages but on

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tactical requirements; and assuming equal accuracy, mobility and handiness in action this reduces to a choice, in the case of field artillery, between shell power and ease of concealment on the one hand, and range, rapidity of fire and shrapnel on the other.

Shell power from a technical point of view is largely a question of capacity—the shell being regarded merely as a container for high explosive or other filling. It is therefore principally a matter of size. From a tactical point of view a consideration of shell power cannot be divorced from the purpose for which the shell is intended. If the shell is to be used for the destruction of cover or for the formation of smoke screens obviously the big shell will give better results than the small; if on the other hand the shell is to be used to support or repulse an infantry attack there are other factors to be considered.

The danger area is one of them: so long as infantry is the principal assault arm some form of timed artillery programme will be necessary to neutralize the fire of the large number of concealed machine guns and light automatics to which they will inevitably be exposed. The effectiveness of this timed programme will largely depend on how close the infantry can approach to the artillery fire. Consequently a shell having a small danger area, so far as our own troops are concerned, is essential. Though this condition can be met by the 18 pr. firing shrapnel it cannot be satisfied by the howitzer firing high explosive.

Another factor is stopping power: in spite of its large danger area from the point of view of our own troops, the effect on advancing enemy infantry of the howitzer shell filled with high explosive is comparatively local. Though quite capable of killing one man several times over, it is unsuitable for killing a large number of men once—the main requirement of a shell when used against an infantry attack. In fact the 18 pr. with its higher rate of fire is, whether firing shrapnel or high explosive, better suited to stopping infantry in the open than the howitzer.

A third factor is screening effect: no one will dispute that the screening effect of the bigger shell is better than that of the small; and, in the case of smoke, the 4·5 shell is incomparably better than the 18 pr. So much so, in fact, that under suitable conditions for smoke one howitzer battery is quite capable of screening

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the frontage normally allotted to an artillery brigade in the attack. The use of smoke however raises another question. In supporting an attack is it better to subdue enemy fire by destroying or driving off the personnel producing it, or merely to rely on concealing their target? The answer must be that it depends on the target. Without in any way denying the advantages of smoke, it must be remembered that smoke does not prevent the enemy firing his weapons, and if his fire plan has been well co-ordinated there is no reason why he should not be able to inflict heavy loss on advancing infantry in spite of smoke screens, if left free to use his weapons. On the other hand, if the attack is being carried out by tanks, which, by virtue of their armour, have nothing to fear from small-arm fire, smoke screens may provide all the support necessary, since tanks are only in danger from a few well-concealed anti-tank weapons depending for their effect on being able to bring direct aimed fire on to specific targets. Its value as a smoke-producing weapon might settle the argument in favour of the howitzer if tanks are to be the main assault arm, but this is still a question for the future.

The other advantages of the howitzer—ease of concealment—has reference of course to concealment from ground observation. Whatever benefits this confers during the very mobile phases of warfare disappear as soon as a pause in the operations affords the enemy an opportunity of developing his counter-battery organization. In these days of air photography, sound-ranging and flash-spotting only an ostrich would be really convinced of the howitzer's greater security from discovery.

Turning now to the question of range, it can be claimed that in spite of its shorter range the *useful* range of the howitzer does not compare unfavourably with that of the gun, because, owing to its greater crest clearance, it can be sited further forward on the battlefield without having a wide zone of dead ground in front of it. But this is looking at the matter from the point of view of defence only. In the attack, dead ground is of minor importance and guns can be sited well forward where they can make full use of their longer range to pursue the enemy with fire, harass his back areas, and delay his reinforcements. Morale also has to be considered. Range is a rough measure of the superiority of one weapon over

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another, and the knowledge that the enemy's artillery possesses the advantage of range can hardly fail to exert a depressing influence on one's own troops. Consequently any alteration in the proportion of guns and howitzers which reduces the range of the artillery will not only mean sacrificing all the advantages range confers but may well affect the morale of the army as a whole.

The next point to be considered is rapidity of fire. It can be argued that the rate of fire of the howitzer is sufficient to meet all normal demands for artillery support—but this is not enough. If the artillery is to give effective support to the other arms it must be capable of meeting the *abnormal* demands of critical situations. It is then that the high rate of fire of the 18 pr. is of inestimable value, providing, as it does, an ever-ready reserve of fire power. An increase in the number of howitzers must reduce, even if it does not eliminate, this reserve of fire-power, and by so doing will render the field artillery less capable of effectively supporting the other arms.

Finally there is the question of anti-tank defence—now one of the principal pre-occupations of the field artillery. Here the howitzer cannot take the place of the gun. Whether the 18 pr. is the best possible weapon for the purpose is beside the point—it is certainly the best weapon at present available. In the future, if tanks form a large part of every army, it is probable that special anti-tank weapons will be provided on a more generous scale than at present, and then the anti-tank role of the artillery may become of minor importance. Until then, however, the main responsibility for anti-tank defence must rest on the artillery and in particular on the 18 pr.

From these considerations it seems reasonable to conclude that the greater portion of the demands on the field artillery can, at the present time, be better met by the 18 pr. than by the 4·5 howitzer. In the future tanks may replace infantry in the assault; when that time comes the artillery must be ready to provide the type of support tanks require. If, as seems probable, that support can be most effectively given by smoke then the superiority of the howitzer for the formation of smoke screens is a factor that may outweigh all other considerations and result in the replacement of guns by howitzers. To-day, however, infantry not tanks form the

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principal assault arm, and for the support of infantry the gun possesses advantages which entitle it to its present position as the chief weapon of the field artillery.

So far the question has been treated solely from the point of view of present weapons. Would the answer be different if the 4·5 were replaced by a new howitzer capable of firing shrapnel and equalling the 18 pr. in range? At first sight such a weapon appears to embody all the advantages of both gun and howitzer. Nevertheless it has its drawbacks. In the first place it must have multiple charges and this precludes the use of fixed ammunition. Consequently it is difficult to see how it can develop a high rate of fire, and if it is incapable of this not only must its effectiveness as an anti-tank weapon suffer but, in addition, the reserve of fire power now provided by the high rate of fire of the gun will disappear. A second, though perhaps less obvious disadvantage of adopting a long-range howitzer as a substitute for the gun in the divisional artillery arises from the problem of ammunition supply. Owing to the heavier projectile fired the tonnage of ammunition expended will be considerably increased, more transport will be required for its conveyance, and the already over-burdened roads behind the front will be subjected to an additional load. This may prove the last straw. If it does, then instead of mobility, there will be congestion, immobility and chaos.

At the present moment a discussion of the merits and demerits of this weapon must be largely academic, for though it is permissible to hope that it may replace the present howitzer it is difficult to imagine an event more improbable, under existing conditions, than the complete re-arming of the divisional artillery. That being the case there is little to be gained by pursuing the subject further. Perhaps enough has been said, however, to indicate that, in spite of its advantages, the long-range howitzer, as a substitute for the gun, does possess certain disadvantages and that these may be serious.

How serious only experience will show.

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THE CONQUEST OF SIND.

Early History.
The First Afghan War.
Sir Charles Napier.
The withdrawal from Afghanistan.
The Ameers and the treaty.
The Battle of Meeanee.
The Battle of Dubba or Hyderabad.

With Sketch Maps of Sind and Meeanee.

By Lieut.-General Sir George MacMunn, K.C.B., K.C.S.I., D.S.O.,
Colonel Commandant, R.A.

Early History.

WHEN I was a boy at Chelsea College, the old name for the Royal Hospital, for a "college" is a collection of people, I knew an old soldier of the 22nd Foot, known to his intimates as "Big Joe", who had served "along o' Charley Napeer in Sind", or as they spelt it in his day, Scinde. And therefore I always wanted to see Sind, and learn all about it, but it was many a day before, as chance would have it, I was able to tarry there awhile, not in fact till I was putting in four years' hard labour as Quartermaster-General to the good Lord Rawlinson, and then one day I found myself at parade service in the little Garrison Church at Hyderabad, and had the same feeling that I used to have in Saugor, that I was back in the glorious past of the Army. Hyderabad and Saugor are places where things don't change much. But this is but a prelude to a really serious talk on the conquest of Sind and how it came about, a talk that is really worth while, for without it India as we know it could hardly be India. And it is a story not very easy to follow, and one that has been grossly misrepresented, both by the quite unworthy press of Bombay at that period, and the strange conflict between two men of such high character and noble aims as Sir Charles Napier and Colonel Outram.

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SIND AT THE COMMENCEMENT OF THE VICTORIAN ERA.

To get the question of Sind into correct perspective we must first of all revert to the days of the Mogul Empire before Nadir Shah, the Persian Turk, invaded India and cut off therefrom the northern provinces, viz. Afghanistan as we now know it, and the various provinces of the Indus. In 1748 Nadir Shah, otherwise known by his assumed title of Nadir Khan Quli, the Slave of Destiny, was murdered and the Duranni Empire of Ahmad Shah Abdalli commenced. Sind, the great fluvial province of the lower Indus, was a pure Indian province, largely inhabited by people analogous to the Jăts of the Punjab and the Jāts of the neighbourhood of Delhi. They had not undergone the centuries of colonization by Mongol, Turk and Afghan as had the upper provinces of the Indus, for the routes from Central Asia converged on various points higher up at or near the Indus, from Mooltan northwards. In the eighth century there had been an Arab conquest of Sind and an Arab kingdom founded from Basra, about the time of the Saxon move to England, but this, while introducing Islam long before the faith of the Prophet had reached the rest of India, had faded away as the Arab Empire dwindled in power. It is now but marked by the striking similarity existing between that hardy race of sailors, the men who sail the great vessels up the Indus, and those who follow a similar vocation on the Tigris. As the Shatt-el-Arab came to the Sind in the eighth century, so in the twentieth the Sind came to the Shatt, for time is in no hurry to make its adjustments.

In the days of Aurungzebe, the last of the Great Moguls who was great, Sind, which is but the Indian name for the Indus, was a province of Delhi, populated by an exceedingly industrious peasantry, who dwelt within reach of such inundation canals as their skill could take off the Indus in its flood season, waiting patiently for more water, as indeed does all India. Now at last they are to see what countless generations have dreamed of, the spreading of the surplus water of the Indus and the Punjab over their lands. In a year or so from now, the completion of the great barrage at Sukkur, will put many millions of acres under wheat and bring wealth and land that is now desert to several million peasantry, so hard and so impious is the rule of the British that

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succeeded to King Sword and Queen Famine. But that, too, is but by the way, save that "old Peccavi", the nickname borne of Punch's *mot, "Peccavi"* (I have Sind) dreamed it all, as he carried out the behests of the great and good Lord Ellenborough.

When Ahmad Shah founded his Afghan Empire from the direlict Mogul provinces across the Indus, Sind was one of them. After the manner of the East, nay of the world, patient peasants have overlords, barons who strive one with another, and reap the guerdon of rent and cess where they sow not. Sometimes they earn that cess by offering protection, which is the sole right that has any justification, often they earn it not at all. The peasantry watch the come and go of barons, Norman and Saxon or Dane, Mogul or Turk and Afghan, and turn the plough deeper in the sod, and pray that new master will not be more unreasonable than old master. And the great kings higher up in the scale care not, save only Akbar the Great, who it be and how the peasantry are treated, so long as they get their share of the revenue and their meed of military service.

At the beginning of the eighteenth century when the Moguls were struggling with Persia for Kandahar and Lower Sind, the overlordship of Sind had fallen to a fanatical family from Persia, the Kalloras, and in 1778 the Kalloras were ousted by a Belooch tribe and family, the Talpoors, who divided the country among them into chieftaincies and were confirmed in their seizure by the Duranni power which claimed the Empire in which Sind lay. When the original Talpoor chief died in 1800 his four brothers, known as the *Char Yar*, divided the power, calling themselves the Ameers of Sind, in which the headship in each state remained with the eldest surviving brother. The Ameers of Hyderabad and Mirpur were the Lords of Lower Sind, and the Ameer of Kairpur Lord of Upper Sind, but the Ameer of Hyderabad was recognized as having some accepted authority over all. When the Duranni Empire crumbled, and the Barakzai Viziers seized the power from the family of Ahmad Shah, the Belooch chiefs of Sind all tried to throw off their allegiance to Kabul.

Afghanistan broke into several independent chiefships also. But in all these temporary fissures two historical and indeed geographical truths remained. Sind was either a province of India or

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of Afghanistan, and the little pots could not hope to swim long alone in the stream. When the attention of the British was drawn to the threats of first Napoleon and the Tsar, and then in William the Fourth's reign, of the Russian advance among the Central Asian Khanates, the first conception of a barrier between India and Russia took the form of an outer and an inner layer of states. The inner layer were to be Lahore, Bhawalpur and Sind, the outer layer, Kabul, Herat and Persia, and if possible by alliance and agreement the unabsorbed trans-Oxus Khanates.

When Shah Sujah, the exiled and ineffective but rightful monarch of Afghanistan, first tried to regain the throne he did so, both in 1818 and again in 1834, *via* Sind and Shikarpur. The Ameers of Sind then attacked him and were defeated, paying him five lakhs of rupees to get rid of him, which was nominally arrears of tribute to Kabul.

By this time Great Britain as a trading power was immensely interested in the navigation of the Indus, a mighty waterway well covered with craft, and in the safe navigation of which British India, with a station at Ferozepur, was now intimately concerned. The interests of the whole world were involved and interference with trade on the river was a fruitful matter for quarrel between Runjhit Singh at Lahore and the Ameers of Sind. It was obviously essential that the question of transit, transit dues, and the equitable satisfaction of any just rights in dues, should be amicably settled. At the beginning of the thirties Colonel Pottinger had been sent to Sind to open up some *modus vivendi* and to represent the Company. Further Runjhit Singh, who had absorbed all the other Afghan districts on the Indus, was quite prepared to conquer Sind and the Ameers were equally anxious to save themselves. What the British wanted was peace and order and reasonableness along the whole Indus and at this period they had not the slightest desire to annex the Punjab or Sind. These happenings were but thrust on them by fate. But it must always be remembered that Great Britain as the *de facto*, and in a certain sense the legal, successor to the broken Mogul power, had the right of supremacy and influence in all the provinces that had broken off the parent stem in the long process of degradation through which the Empire had passed.

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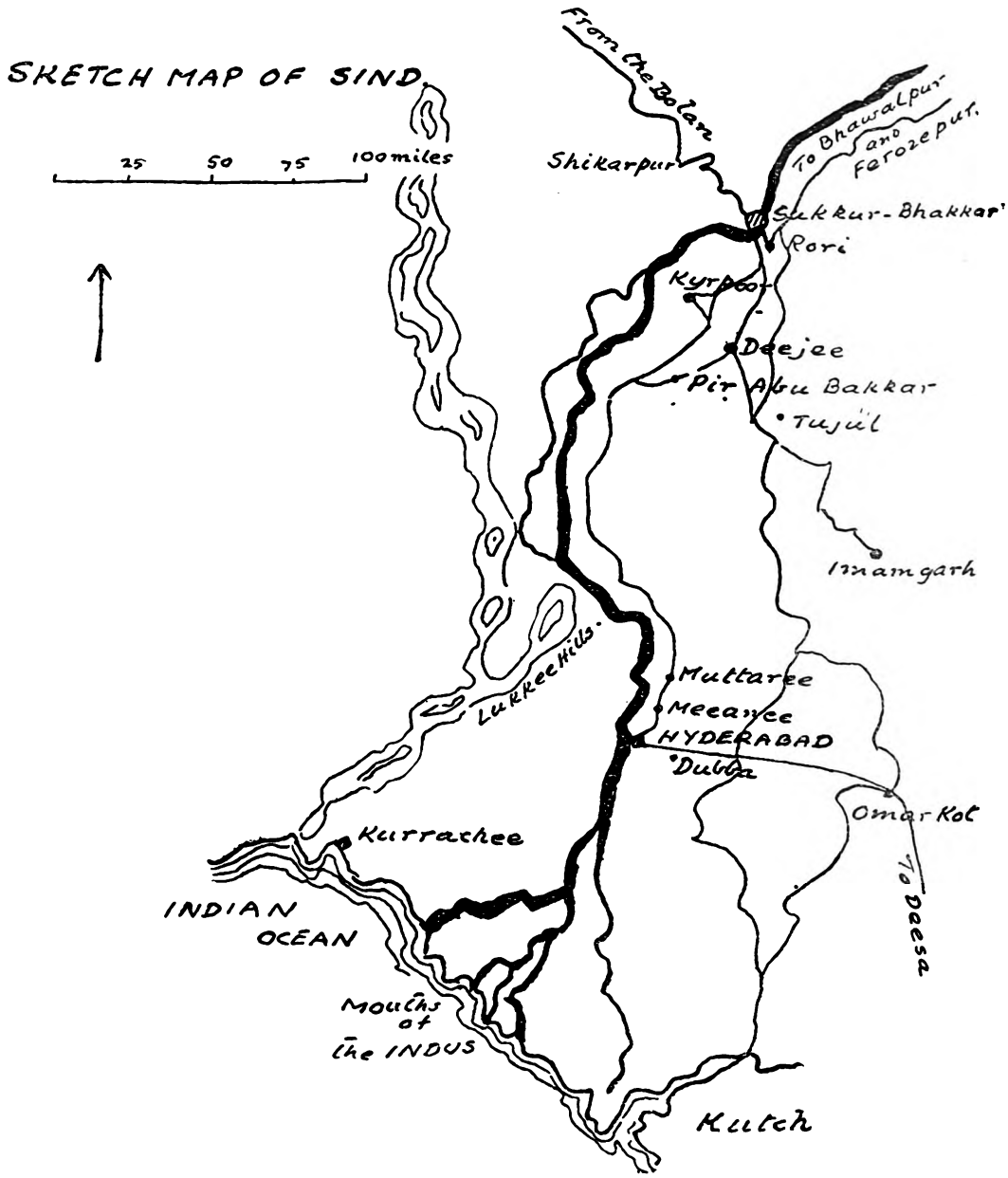

THE FIRST AFGHAN WAR.

The history of the Conquest of Sind is directly connected with the story of the attempt to restore the Duranni power in Afghanistan which drifted into the First Afghan War. When, in 1837,

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the long series of disturbances on the Afghan border that were so disastrous to trade, brought us to attempt to solve the Central Asian problem on broad and generous lines, we decided to restore the Shah *via* his ancient province of Sind. We required from the Ameers an agreement to our passage of their territory from both north and south for our own and the Shah's troops and the temporary rendition into our hands of the great fortress of Bhakkar which dominated the world's highway, the great crossing of the Indus in Sind. Now this treaty which, however immediately forceful, was but the rightful demand of a paramount power, was not unaccompanied by many advantages pecuniary and otherwise. Had those princes chosen to abide by their engagements and be reasonably attentive to the advice and suggestions of the British Resident, Sind would have remained independent if tributary, exactly as their neighbour the Khan of Bhawalpur has remained to this day. In pursuit of the treaty made in 1838, the Army of the Indus, joined by the Bombay Army at Sukkur, moved into Afghanistan. During the vicissitudes of that war, a British force garrisoned Kurrachee and held a cantonment at Sukkur Bhakkar. By the skill of the political officers the Ameers and their wild gatherings of tribesman retainers, Afghan mercenaries and the like, were prevented from joining in the wild uprisings against the British. But Colonel England, who commanded in Sind, had got himself into an entirely unnecessary and disgraceful reverse at Haikalzai beyond Quetta in an attempt to take supplies through to Nott in Kandahar.

It was considered necessary to put the affairs in Sind in strong hands when Nott marched to Kabul, and the ineffective England was charged with evacuating the residue of Nott's forces from Kandahar. It is from this period that dates the whole story of the conquest of Sind.

Sir Charles Napier.

Sir Charles Napier was one of the most distinguished soldiers of the period and indeed of British history, but this distinction had come on him unsought when past sixty years of age, much shattered in youth by severe wounds in the Peninsula, he had been made a major-general by the brevet of 1837. Prior to that he had spent many enthusiastic years developing Cephalonia, the chief of the

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Ionian Islands of which he had been governor, and immediately before his sailing for India had been specially concerned in the handling of Chartist riots in the north of England, where his sympathetic yet commonsense action had got the Government of the day neatly out of very unhappy troubles. Then Lord Hill, the Commander-in-Chief, offered him a command in India, and he found himself in 1841 commanding the Poona Division. The position in Afghanistan, which soon merged into the massacres of the Kabul brigade, the equally pitiful surrender of Ghuzni, and the defiant leaguer of Jallalabad, was on everyone's lips in India. The tails of the Army were down, not only because of disaster, but owing to the way in which efficient officers were shepherded to that disaster owing to the astounding political system in force in Afghanistan. The first task he set himself was to kill the view that was being bandied about as an excuse for some of our troubles, that the matchlock was a superior weapon to the musket. Having some more knowledge of musketry than most officers of the day, he was well qualified to carry out experiments, which conclusively proved to the Bombay troops that they had the superior weapon, and he explained that the impression of a superior range was due not to the weapon but that it was nearly always fired from heights on our folk below or engaged in escalade.

Then came the chance that the ambitious old soldier had been waiting for since the days of the Peninsula. And it is to be remembered that he was the son of an extremely able mother who was also the grand-daughter of no less a character than Charles II, while his brothers, General Sir William Napier and Admiral Sir Charles Napier were equally distinguished. Lord Ellenborough had succeeded to the tired and vacillating Lord Auckland, weary of his own policy and the failure that had resulted from it. The new Governor-General had realized how the system of political control in times of danger had produced the situation that had ended in such humiliation, and he was putting a stop to it. In his opinion also the Ameers of Sind were endeavouring in every way to cozen the British and evade their obligations to them. He therefore appointed Sir Charles Napier to the command in Sind and to the chief political power. Major Outram, a most distinguished officer of the Bombay Army, long known for his successful and humane

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dealings with wild tribes and famous as a shikari, had been political agent for some time and had brought the Ameers without outbreak through the extremely difficult times of the Kabul disasters. He had also distinguished himself greatly in the earlier part of the Afghan War. He was in some disfavour with the new Governor-General over the matter of an unfortunate young political officer who had been accused of causing the ambuscade of Colonel England's column. This column had walked with its eyes shut up an entrenched valley held by the enemy. But at that time so emasculated was the military enterprise of portions of the Army that it could not attend to its own information and everyday safety. Outram had protested that the young political was not the Army's nursemaid. Incidentally the lad had died of his wounds raving. Napier was full of sympathy and asked that Outram might remain with him as his principal assistant for his political responsibilities. He had also paid great tribute in public to Outram's services and well-known attributes, so that they started off well together.

Napier arrived in Sind in September 1842, bringing with him a portion of the 78th Highlanders. Except for the garrison at the small port of Kurrachee, the troops that Napier was to command were in Upper Sind at Sukkur, but the major portion of his force did not materialize till England returned from Kandahar, when Napier was to canton them at Sukkur and send the Bengal troops back to the Punjab, which would leave him at most 12000 men. In the meantime he was to use such troops as he had to support the return of England and keep off the Belooch hill tribes from the latter. Outram himself, the chief political, was up sweetening the tribes in the Quetta neighbourhood to let the withdrawing troops alone. That withdrawal following on the victorious reunion of the southern and northern British forces at Kabul, was looked upon as a sad confession of ultimate weakness.

The Withdrawal from Afghanistan.

General England, as he now was, had no great reputation, for Haikalzai and other ineptitudes were in most men's mouths, but when his force eventually straggled down from the passes, Napier, thinking that he had been misjudged, wrote him a very handsome letter of congratulation. Later when he saw the miserable want

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of order and system prevailing so that his whole force could have been easily destroyed he was very indignant, especially at the way the wounded from Haikalzai were brought down and the way that officers were caring for their men. He arrived at Sukkur by steamer at the end of September, having ordered the officer commanding there to move out to cover England's columns from the hills, and then met Outram for the first time. The two men of action took an immediate fancy to one another, which lasted for some little while; Outram proceeding shortly on furlough only to come back almost at once as Civil Commissioner to Sir Charles.

The Bengal troops were to march away, much to Napier's relief, as he described the feeling between them and the Bombay troops as extraordinarily bad. Then he sat down to get his troops under cover at Sukkur before the next summer and generally to reorganize the area and settle the political system, as the Governor-General in his unthinking way had abolished the whole establishment by a stroke of the pen. The Governor-General was determined to settle the Sind business once and for all and now offered Napier General Nott's troops when they returned down the Indus as they would on emerging from the Khaiber. This, however, he did not want. What he did want was cavalry, and authority to expand the Irregular Horse now being worked to death under the young Bombay Gunner, Captain Jacob. He received eventually two regular regiments, the 9th Bengal and the Poona Horse.

With the evacuation of the remnant of Nott's force from Kandahar and the rolling up of the posts through the Bolan and Kach-Gundava the Afghan campaign and Sir Charles's connection therewith was at an end, and the aftermath thereto in Sind was about to ensue.

The Ameers and the Treaty.

The treaty which the Ameers of Sind were compelled to make with the British and Shah Sujah has been referred to. Whether it was fair or unfair is a controversy which has long since passed. It can now as we know it after the lapse of years only be called unfair if we consider the whole British venture or fate in the East unfair. Lord Ellenborough considered that the Ameers, reading

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from Outram's reports, had endeavoured to evade it at every turn. He now sent very definite orders to Napier to see it strictly observed, and ere long propounded an amended one which the Ameers must accept. Sir Charles thought the original treaty an undue interference with the Ameers, but that they who were notoriously the worst rulers and cruellest oppressors of a peaceful and unwarlike peasantry in India, would be infinitely richer and their people much happier if it had been scrupulously obeyed. It is to be observed that they themselves in the lifetime of the oldest of them had seized the rule, assisted by the hill Beloochees, and maintained their position with the help of hordes of tribesmen and mercenaries, both Afghan and Belooch. They had given lands and villages to be the prey of their followers and cared nought for the Sindian, whom they even prevented from making what they could from trading and agriculture, by the ignorance and oppression of their rule.

To Outram who had handled them through the difficulties of the Afghan trouble they were picturesque chiefs for whom in some ways he had sympathy and affection, and to whom he had in the handling of them, given all sorts of assurances. He, like Henry Lawrence, aimed and dreamed more of making chiefs and barons better, than at getting rid of them. But there was no doubt that they had at their call immense numbers of well-armed men both the hill Belooch, from their own plantations of barons and followers, and from hordes of Afghans and other wild adventurers who would flock to their call. For the Ameers had immense personal wealth squeezed from the rich Indus traffic on which they sat, and from their peasantry.

To enforce the existing treaties, to enquire into the more deliberate evasions, especially in the matter of fluvial trade to the Punjab and the dues arising, and to see the new ones signed was the task of Sir Charles Napier. Shilly-shally, intrigue and evasion were not unnaturally the order of the day. Outram thought the Ameers would sign and give guarantees, but Napier and his staff knew well how the army had perished at the hands of political optimism and misjudgment, and the Afghan suspicion and atmosphere was ever present in their minds. They were not prepared to accept the political view and intelligence as correct. They

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believed that Outram was entirely misled by his own *jasus*[1] and agents, that the Ameers were conspiring to fight and were assembling immense forces, this, especially the assembling of forces, Outram denied. Unfortunately but happily for the country Napier was right, for the Ameers had collected 50,000 to 60,000 well-armed and very warlike followers. Napier decided that as the Governor-General's wishes were being deliberately evaded, and that the Ameers were not out to settle peaceably, he would march on Hyderabad, the centre of the trouble, where Outram himself had a residence, in the hope that his approach with his force would induce them to be more reasonable. The old treaty and the new, while bringing the Ameers into control were greatly to their real advantage, and also a necessity of modern life on the rivers.

Sir Charles Napier was every inch a soldier and a regimental soldier. He had very soon pulled the draggled forces that had come down the passes into order. The troops were now alert and well-disciplined with their tails curling over their heads in a way that they had not curled for several years. Their Chief had, moreover, taken their fancy. But the winter of 1842/43 was passing and a Sindian winter passes to a Sindian summer and heat unbelievable, in a very short time. Napier was not going to let negotiations which he believed spurious, drag on till the heat forbade his troops taking the field.

The Ameer of Upper Sind had his capital at Khairpur, not far from Sukkur. He was Rustum, a very old man, a survivor of the seizure of Sind from the Kalloras. His son was intriguing to get the old man to abdicate in his favour, whereas the succession by right and custom must go to his eldest uncle, Ali Murad. Eventually Rustum did put himself in Ali Murad's hands and Napier recognized the latter as Ameer of Upper Sind. The sons of Rustum and other brothers took their troops out, and some actually moved to the famous desert retreat, the huge fortress of Emamgarh, where they had always been inaccessible in time of trouble. Napier felt that he must kill the idea of inaccessibility once and for all, and moved out on December 26th with his force or as much as he could get camels for to the edge of the desert at Deejee, 30 miles, and there left the bulk while he moved 350 of the 22nd Foot on

[1] Spies.

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camels, two 24 pr. howitzers with double teams of camels, and 150 of the Scinde Horse. Pushing over heavy sand with very little water they arrived at Tugul on the absolute edge of the desert, forty miles from Deejee, and thence sixty miles more to Emamgarh, where he arrived on the 12th of January 1843, carrying his water as well as his food.

The birds had flown, astounded at the British enterprise, whereon Napier spent 10,000 lbs. of powder he had brought for the purpose in blowing up the stronghold, which he considered rightly enough a quite unnecessary appanage of Amirdom. He then marched back to Pir Abu Bakr on the road from Sukkur to Hyderabad, and 45 miles from the former to which he had ordered the main body at Deejee to move. Outram he sent to Khairpur, having summoned all the recalcitrant relatives of Ali Murad to meet the Commissioner. As they did not come in, Outram persuaded Napier that if he returned to the Residency at Hyderabad, he could at any rate make Naseer of Hyderabad, and Shere Mahomed of Mirpur see reason and sign the new treaty. Sir Charles, learning that the Ameers were increasing their forces every day and that some thousands of the hill Beloochees, Rinds, Logharis, Chandians, etc., were coming down behind him, decided to push on for Hyderabad and leave the matter to push of pike if need be, before these vast accessions of strength might arrive.

The force at his disposal was small enough, barely 2800 men, consisting of the Poona horse, the 9th Bengal Light Cavalry, H.M. 22nd Foot, the 2nd Bombay Grenadiers, the 12th and 25th Bombay Infantry, and a company of the famous Madras Sappers with Hutt's and Lloyd's batteries. This force in great heart, despite the increasing heat, reached Muttaree, 20 miles north of Hyderabad and 160 miles from Sukkur, on the 16th of February.

The Battle of Meeanee.

Now was to begin one of those desperate battles which go to make up the great tradition of the British Army and the Army of India. At his camp at Muttaree Napier learnt that the Beloochees in immense numbers were established in and behind a deep dry watercourse, the Fullaillee, some ten miles ahead. Outram's messages from the Residency still asserted that the

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Ameers did not mean to fight, had not massed their men, or alternately, had sent them away. Napier's information was far otherwise. 30,000 Beloochees in arms were ten miles from his 2800, and blocking the way to Hyderabad on which he was marching. Therefore he advanced on Meeanee at midnight, arriving before their position at daybreak, in line of columns, the 22nd Foot on the right, the mounted troops on the left. Close to his right was the eleven-foot unscalable wall of one of the immense *shikargahs* of shooting parks which the Ameers delighted to make. It was too thick to use as a method of approach but Napier dropped a company of the 22nd at the only opening to hold it to the last man, and thus protect most effectively his front and rear and baggage column.

The latter were parked under the Poona Horse as guard, and then the battle was ready. It was to be shirked by neither side and its story is a sheer record of hammer and tongs, tulwar on bayonet and locking ring. The British formed line and advanced towards the river bed, to find that the enemy's musketeers were holding the hitherside, these opened a hot fire, and then masses of swordsmen rushed forth. They were slowly beaten back to the edge of the river bank after severe hand-to-hand struggles, and then below them the British saw countless swordsmen and brilliant colours, a wild and picturesque sight. After three hours more of desperate charge and counter-charge the cavalry on the British left got across the Fullaillee and dashed in among the crowds on the far bank. Then the Beloochees slowly broke away but many remained to fight it out, giving no quarter and asking none. They left 5000 on the field. It was as brilliant and fierce a struggle as the Army had ever experienced, and the Indian troops vied with the 22nd in dash and courage. Hyderabad was occupied and all the Princes, the Ameer and his relatives surrendered.

Outram, who had a small escort of British and Indian troops, was attacked the day before in the Residency by several thousand Legharis, who were beaten off after a prolonged struggle. The Ameers had succeeded in bringing over from the opposite bank some 20,000 of the hill tribes to swell their forces, Outram eventually withdrawing to his steamers, got in touch with his chief and with a detachment was engaged on the day of the battle firing the

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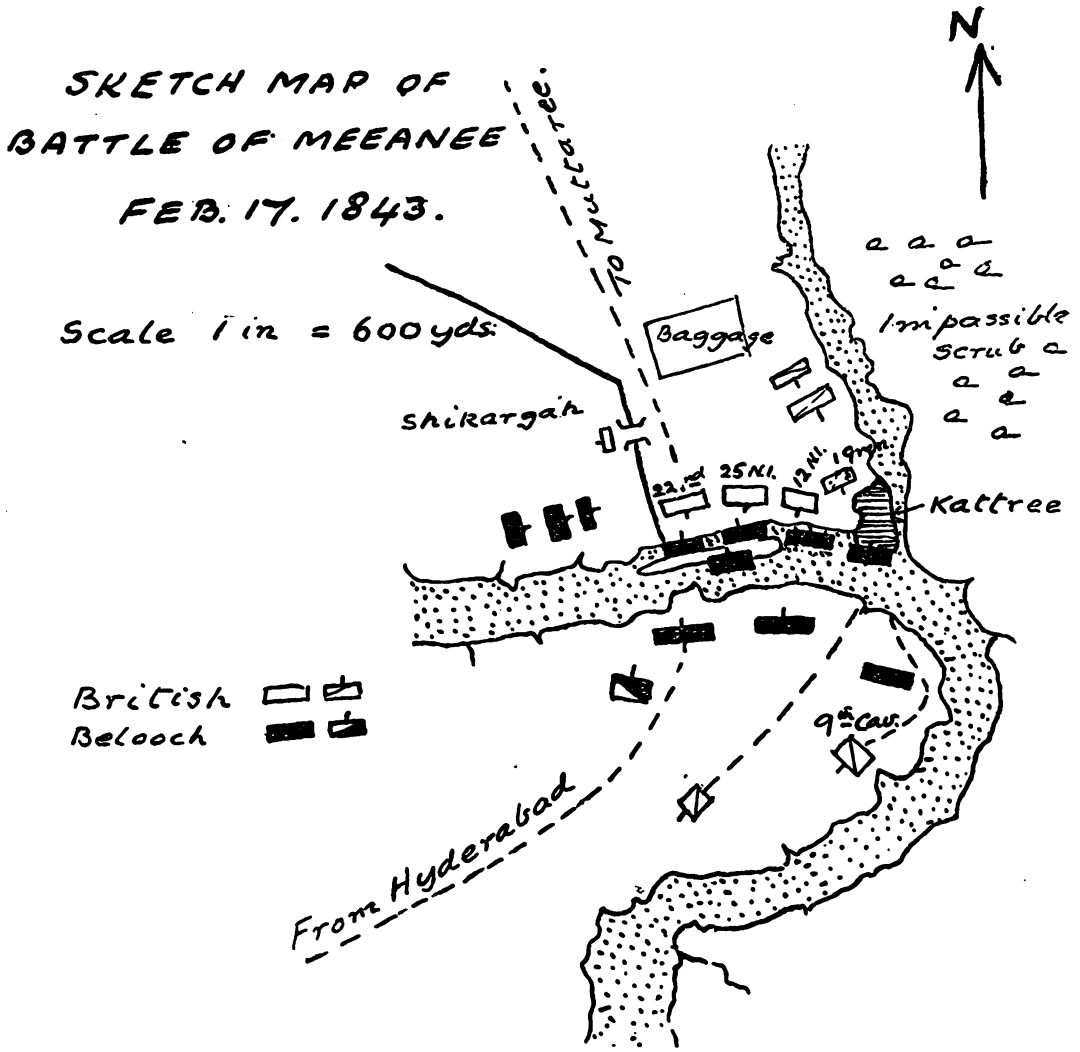
Shikargah to drive out lurking Beloochees. After occupying the city, and putting 400 men in the great rock fort, Napier withdrew to the Indus bank and there threw up an entrenched camp, in case of need, but camped his men in the open in front of it. His force was now reduced to 2000 men, and he sent up to Colonel Roberts at Sukkur and down to Kurrachee for every man that could be spared. The whole river bank between Hyderabad and both Sukkur and Kurrachee, however, was in a most disturbed state, stray bands of Beloochees attacking any post or detachment they could find. Lord Ellenborough, hearing of what was in progress,



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sent reinforcements from the Sutlej unsought. Stack and the 3rd Bombay Light Cavalry, Blood's and Leslie's troops of Bombay Horse Artillery, and a battalion, while Roberts also sent a battalion and details. Time was getting on, the heat was getting great, and Shere Mahomed, the Ameer of Mirpur, had collected some 30,000 men, those who had fought at Meeanee and others, and now summoned Napier to surrender. The fate of the Kabul garrison was openly promised him: "he shall now be Cabooled" men said. It was not till well on in March that reinforcements could arrive. As Stack's column approached, by the same road that Sir Charles had marched, Shere Mahomed threatened to overwhelm him. Napier ordered him to double his last march and sent out Jacob's Horse to meet him, following himself with a strong column. They evaded Shere Mahomed by a day, and on the 22nd Napier had them all united on the banks of the Indus. On the 23rd ships brought details and drafts from Kurrachee, and unexpectedly too a host of masts appeared from the Sukkur bringing a battalion and some much-needed gunners from Roberts.

The Battle of Dubba, or Hyderabad.

Thus reinforced, giving Stack's troops a day's rest, Sir Charles sallied forth on the night of the 23rd March to meet "The Lion", Shere Mahomed, who had spurned all proposals for negotiation. Marching ten miles inland, Sir Charles at dawn learnt that the Beloochees were entrenched two miles ahead, along a deep nullah which ran into the winding Fullaillee on its left bank, with their right on the village of Dubba. Deploying his force on the plain in front, he advanced in echelon from his left, the 22nd leading, under a sharp fire from fifteeen of the Ameer's guns. The British force, pitifully small though it seemed for its task, was far superior to that that won Meeanee. When formed the line was arrayed as follows:—

The Poonah Horse.
The 9th Bengal Light Cavalry.
The 22nd Foot.
The 25th, 21st, 12th and 8th Bo. N.I.
The 3rd Light Cavalry and the Scinde Horse.

Some 19 guns were in the intervals, only one of the troops

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of horse artillery having come up. It was such a fight as Meeanee, opened by the 22nd attacking the nullahs and gaining the village, battalion after battalion coming up in succession and throwing themselves at the masses of standards and swordsmen on their front. Napier in person gave the order to the 22nd to start. The fury of the troops was too much for even the Beloochees, who were driven from nullah to nullah. The cavalry on the right, to the General's consternation, started a charge on their own which was gloriously successful, and the Beloochees now left the field in large numbers, some following Shere Mahomed who was making for the desert, others the hill tribes making for the Indus in the hope of re-crossing, but only to be a prey to the cavalry, while many elected to die where they stood. A British officer and his wife had recently been murdered, and his name was constantly on the lips of the sepoys as they refused quarter.

Fierce as had been the fighting, the casualties to the British were far less than at Meeanee, totalling only 270, of which 147 were in the 22nd who had first engaged. The enemy's loss was estimated at 5000 with their fifteen guns and seventeen standards, and a complete loss of prestige and further desire to fight. Shere Mahomed had made for his capital at Mirpur, where the Poona Horse arrived next day in pursuit, when the townspeople opened the gates saying that the Ameer had fled with his family to the desert stronghold of Omarkot. Napier himself followed to Mirpur and sent Jacob and the camel battery, followed by the 25th N.I., to Omarkot. Owing, however, to the fear of the inundation now due, the British commander was anxious to get his troops back to the Indus and recalled the Omarkot force. The officer commanding, Captain Whitlie of the Artillery, hearing that the Ameer had abandoned the town, referred for fresh orders and was directed to proceed. It was found that the fort was still held by Beloochees. The Ameer was gone, and the garrison on the arrival of the guns and the 25th Bombay Infantry, surrendered. A garrison was then left and the last stronghold of the Ameers, distant a hundred miles from Hyderabad, was in British hands. But the fierce summer was now in full blast, and it was important to get the troops under cover. Thus ended this most dramatic campaign.

Sir Charles was immediately appointed Governor of Sind,

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which was annexed and steadily cleared of Beloochees, and then commenced several remarkable years of rough and ready common-sense administration, which well prepared the way for the ordinary civil administration which was to follow. For many years, however, Sind was a special problem attracting a wonderful set of British officers who accomplished more than even Sir Charles Napier with all his enthusiams dare dream of. That great cameraderie and spirit of the Sind personnel and band of builders was something quite apart and lasted long in the land, up to the end of the nineteenth century, and even endures in some sense still. Now this province which Sir Charles and his handful of troops rescued from an utter darkness is about to see the waters of the Indus spread over the land. Its little *bander* of Kurrachee is one of the great ports of the world, and the province bids fair to be one of the richest in India.

The Bombay Press for some strange reason elected to conduct a campaign of calumny against the whole force, even going so far as to say that the zenana of the Ameers of Hyderabad was distributed among the officers of the force. This called forth a signed protest to which most of the officers of the army appended their signature.

The Outram controversy raged somewhat discreditably, and the General was angered that Outram gave to the India Office a memorandum of his, which had not been attached to the state papers and which it published. It was altogether an unaccountable episode, and at this distance of time we can feel that Outram had been much tried and strained by all he had gone through and was not at his best. The whole of Army opinion throughout India was delighted to see the soldier act up to his responsibility and rely on his own judgment. And there is no manner of possible doubt that the Ameers not only had decided to resist and summon the hills to their aid, but had it not been for Sir Charles' fighting vigour, his force would probably have been lost. The Governor-General and the Duke of Wellington were loud in their encomiums and Napier had full support for his methods of administration. His order book, both when getting his force disciplined, when fighting the excessive baggage habits of officers and when getting the country happily quieted are or were famous, for Sir Charles

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was a character and when he said things said them in a forceful and unusual manner. In 1846 during the first Sikh War he brought a force up the Indus and the Ravi to join Lord Gough in Lahore. Later when the outcry against "little Gough" after Chillianwalah was great, Sir Charles was brought out to supersede him. Happily Gough's victory at Goojerat, at which no one rejoiced more than Napier, had rehabilitated him, and he left in a shower of glory. The stories of Sir Charles as Commander-in-Chief were many, and his orders and memoranda were often unusual and always to the point. Here is one of the most characteristic. In those days divorce proceedings in the Army usually involved a Court Martial and a sentence of dismissal on a guilty officer. In one such case where the officer was sentenced to dismissal, the evidence showed that the lady in the case had been rather provocative. Sir Charles refused to confirm, writing "I quash the case. History records no second Joseph."

It was later one of the tragedies of the period, that circumstances brought Napier into acute conflict with Lord Dalhousie, that most competent and difficult of Governors-General.

The medal for "Scinde" was worn with the universal rainbow ribbon (it was really the rising sun) given for the Afghan wars, and the Gwalior star. After the manner of the time, there were no clasps, but the medals bore "Meeanee", "Hyderabad", or { Meeanee / Hyderabad } on the obverse as the case might be. Hyderabad was the official name for the Battle of Dubba.

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THE PRACTICAL STUDY OF CO-OPERATION BETWEEN ARTILLERY AND INFANTRY.

AN INFANTRYMAN'S POINT OF VIEW.

By Lieut.-Colonel J. McM. Milling, M.C., *p.s.c.*,
The Bedfordshire and Hertfordshire Regiment.

SOME two or three years ago a very eminent General at the final conference at an Artillery Practice Camp commented somewhat as follows. "In olden days our friends of the artillery used to disappear quietly into the bowels of the earth and there carry out their shooting, annually and secretly. Now we of the other arms follow them into their fastnesses and try to extract of them somewhat of their craft." A true saying and one fully in keeping with the times—this question of liaison, co-operation, a working knowledge of the other's arts and crafts. Field Service Regulations are emphatic enough :—"It is only by effective co-operation that the component parts of any force can develop the full measure of their strength. In order that this co-operation may be effective, each must know the capabilities and limitations of the others, and apply this knowledge in giving and demanding assistance." And again :—"The proper co-operation of all arms wins battles . . . ." The C.I.G.S. from time to time has been equally emphatic.

So there it is, and here the writer wishes to make himself definitely clear, that even had he the hardihood and temerity (which he neither has nor desires to have) to raise matter for argument or dispute, the purpose of this paper lies not therein. It is not the *question of knowledge* of the other arms, but *how that mutual knowledge* is to be obtained which is the point at issue.

We have opened with an assertion respecting our gallant and respected friends of the Royal Artillery, and with fell purpose, because it is with them that this humble infantry soldier, in all friendliness and meekness of spirit, would cross swords. Our brethren of the cavalry, though they move more swiftly and by other means, fight as often as not as infantrymen, are similarly armed, are equally knowledgeable of ground tactics. Our brethren

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of the Royal Tank Corps, still composed to a great extent of one-time infantrymen, must too be equally skilled in ground tactics. Therefore, whilst accepting technical wisdom from their mouths, we probably do not feel that we have much of the technical to give in return, whilst again much of our methods are already theirs. Therefore with them there is no point at issue.

But between the artillery and infantry there is much of difference. For, after all, what in the normal training in "gunnery" can there be of tactics: what in the normal training in tactics of "gunnery"? And how in one is the lack of the other at present met? Generally by attendance of infantry officers at practice camps, by an occasional inter-attachment, by a sometime T.E.W.T. —seldom one conducted by a headquarters lower than an infantry brigade.

One would take the case of the practice camp—take it too because it was an incident connected with a practice camp which led the writer to put pen to paper. And it arose through his hearing quite a senior gunner say, when tackled on the subject of officers of infantry attending a certain practice camp, "Well, we were very anxious for some of you fellows to come and put us right in our infantry tactics." Maybe that's all right, at least it sounds all right. But is it? Is the practice camp really the place for us to teach infantry tactics? Is it the place for the gunner to learn them? Let us consider the point.

It is quite obvious why Higher Authority requires the attendance of infantry officers at practice camps. Obviously as part of "learning their trade"; maybe, to a certain extent, to help the gunner in the learning of his. But the gunner himself? What of him? How in the back of his mind does he regard our presence at his practice camps? As spectators, as advisers, or merely as learners? If as spectators—excellent for the rising generation who has not seen war; if as advisers—excellent again, and the demand for senior officers (nearly always the case) fully justified (if so used), but surely limited only to such as are strictly necessary for the purpose; if as learners—excellent too, but again limited to such days as lessons are there for the learning, and type of student gauged according to the type of lesson to be demonstrated. We too have our work, and these days of professional soldiering bring

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that a-plenty, though we are not quite certain whether we are sometimes given credit even for that.

Now, exactly how many days of the practice camp fulfil the conditions of each of these three? Of the first, as spectators, most days—but one attendance, or at the most two, should be a sufficiency for the individual. Of the second, as advisers, probably only one odd day here and there. Of the third, as learners, possibly always—*provided only*, though, (a) where definite presence with the F.O.O., with the battery doing the shoot, and so on, is allowed, or (b) when real tactics are included, and propounded and explained by a selected and knowledgeable mentor. But the former proviso will always be ruled out—by the gunner. Practice camps to him are stern affairs, and the presence of seekers after knowledge at crucial points is distinctly troublesome. One must confess there was a time when we were of the feeling that our presence was not really wanted, that it was accepted as inevitable and made the best of—always in the friendliest and kindliest of fashions. Now, however, that appears not to be so. Now it would seem that the more senior officers of artillery, at any rate, not only require our presence but insist upon it, and are not over pleased if it is absent. They want lots of us, in their words, "to help them in the ground tactics." That is all right, but why lots? Is it perhaps because they secretly also like us there as spectators?. A friendly compliment if true, but would it be impolitic again to draw attention to it—we also have our work to do, and a lot of it. It may be perhaps that the question of infantry officers attending practice camps has become a "slogan" for the final report on the practice camp, but even thus we are all out to help by our presence, provided always the "useful purpose" clause is not omitted.

We may seem to have over laboured our point, but it is not truly so. We want quite candidly to express our own feelings about it, considerably strengthened by those of other infantry officers whose opinions also we have heard expressed, namely that whilst always most anxious to learn all we can ourselves, and out to give any and every assistance in our power, we definitely, as busy men, do not want to waste our time. And what about it? Is the practice camp the place to learn or teach ground tactics? How often does the ground, or the danger restriction, *utterly defeat*

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any question of including tactics? For instance, how often can machine-guns, save in a rearguard situation, actually carry out a shoot with the guns? How often must targets be placed where neither infantry nor machine-guns would ever remain, tactically? But surely if the gunner wishes to learn infantry ground tactics the time and place is during company and battalion exercises in the field. How often would not a battalion commander give his soul to get either a senior gunner for advice, or a brigade of artillery to produce the realism, on his exercises? How often does he get it? Yet surely that is the place for the gunner to learn ground tactics, not during the practice camp? His shoot at the practice camp should enable him to *try out* his ground tactics. The presence of an infantry expert should be there to confirm his dispositions or correct, not to teach; to co-operate in schemes by impersonating the infantry commander. Another side issue.. Most of us would consider ourselves honoured by the presence of a senior gunner at our training, but how often are we given the opportunity of that sensation, even by the presence of a junior? Is it not, too, perhaps insidiously breeding the germ of thought that the gunner is educating himself at the expense of the infantryman? Queer how the world loves reciprocity! Still, such thought would be a pity and should be quite unnecessary.

So much for destructive suggestion; now for a little constructive. The wants of the infantryman seem to fall under three headings and as such are set out:—

A. *Attendance at R.A. Practice Camps.*

(a) Senior officers:—

1. Practical handling as a commander of a tactical situation, the guns actually conforming to his wishes and orders.
2. Practical demonstration of shoots in connection with a *true tactical situation.*
3. Demonstration of any new gunnery methods, projectiles, anti-tank measures, etc.
4. As required, to act in the capacity of an infantry adviser.

(b) Junior officers:—

1. Demonstration of shell fire, and definite illustration of its effect against such objects as are of importance to him,

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such as concrete emplacements, trenches, machine-guns, etc.

2. Attachments to F.O.O's, battery O.P's, battery and wagon lines, during the process of a shoot.
3. As in (a) 2 and 3 above.

B. *Periods of attachment.*

These to be confined to periods when definite training is in progress; for senior officers limited to battery or brigade periods of training; for junior officers limited to three months, and made to include in the major part periods when training in the field is in progress.

C. *Tactical exercises without troops by R.A.*

1. Attendance as participators.
2. Attendance as infantry advisers.

The wants of the gunner seem also to fall under three headings and as such are set out:—

A. *Attendance at company and battalion training.*

(a) As a commander of artillery (in fact).
(b) As a commander of artillery (in theory).
(c) As an adviser.
(d) As a learner.

B. *Periods of attachment.*

Same as for the infantry officer (above).

C. *Tactical exercises without troops by infantry.*

Same as for the infantry officer (above).

It is thought that, if some such principles were worked upon, co-operation between the Royal Artillery and the Infantry would be very greatly enhanced, whilst any possible grounds for misunderstanding or friction would be definitely removed. Furthermore, this paper is composed not with a view to querying the orders or instructions of higher authority, but to try and indicate a channel for mutual co-operation between the two arms of the service which will give the *fullest effect to those orders and instructions.*

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CHANGES IN FIELD SERVICE REGULATIONS, VOLUME II.

By Captain (Bt. Major) J. N. Kennedy, m.c., R.A.

THE recent new edition of Field Service Regulations, Vol. II, must have come as rather a surprise to most of the Army. It seems only the other day that the 1924 edition was issued and it must have occurred to many that it was a pity to throw it into the melting pot again so soon. But much water has flowed under the bridges since 1924. The main reason for the production of this new edition is to be sought in the numerous changes in the organization of both units and higher formations which have taken place in the last five years. Volume I is of course the volume that deals with organization, but it need hardly be said that every change in organization is reflected in tactical methods. A moment's consideration will make it clear that a number of very important sections in F.S.R., Volume II, 1924, had either become inadequate for modern requirements or been thrown quite out of gear.

Since 1924 machine gun companies have been introduced into infantry battalions, and machine gun squadrons into cavalry regiments. A cavalry regiment has been added to each division of all arms. Tanks have been developed very considerably, and light and close support tanks have now to be considered as distinct from medium tanks. Account has been taken of these and other recent changes in drafting the new instructions for the handling of the various arms. A number of less important points have also been adjusted in the 1929 edition. For example the terms used in connection with attack, defence and protection have been simplified, the rules for writing operation orders have been clarified and brought up to date, and the nomenclature of units has been modernized where necessary.

The general shape of the book is unchanged—its scope is the same and it goes into about the same degree of detail. A criticism of F.S.R. that is sometimes heard is that the book is too much of

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a jumble. It is urged as a fault that in one paragraph one may often read what a brigadier, or a divisional commander or even a commander-in-chief has to do—then, in the next, be dragged down from this rarefied atmosphere to the duties of a battalion or a battery or even a section commander. The solution usually suggested is to produce a book about the Art of War—a book to deal with strategy and the handling of big formations; and to keep all the details of the various arms in their own manuals instead of mixing them up with bigger things. There is certainly something to be said for this idea. As we know, the French have a book dealing with the handling of brigades, divisions and corps and nothing smaller. The drawback to the French system, however, is that, to get a good idea of what the various arms do, one has to read a very large number of supplementary volumes. There is apparently no objection to this in the French Army. But it is suggested that if any British officer were asked whether his library were not already quite big enough, he would return no uncertain answer. It therefore seems a matter for congratulation that F.S.R. remains unchanged in character. From F.S.R. an officer of any arm can get a good general idea of what the other arms do and of how they fit into the machine. By reading F.S.R. and the manuals of his own arm he gets all he needs in the ordinary way. This is a big advantage.

Another very general criticism of the old Field Service Regulations was that they were not definite enough. The seeker after truth would read one sentence and think he had got a definite line from it—only to find that the next might begin "On the other hand, however . . . ." and proceed almost to contradict what had gone before. Or he would discover, on looking up a knotty point, that "the action to be taken depended on the factors involved", which did not help him much. It is to be noted that a very great deal has been done in the 1929 edition to give more definite guidance wherever possible, and very many if not all of the old platitudes have been cut out. In reading the new regulations it is to be borne in mind, however, that, although it is possible to be definite about many things in war, a great many more cannot be reduced to rule of thumb. As someone has very aptly said "Manuals are meant to be a handrail and not a handcuff." We must be left to use our

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own common sense. This has not been forgotten in drafting the 1929 edition.

The contents and arrangement have been somewhat modified. The old chapters I and II dealing with the Principles of War and Command have been combined and cut down. The old Chapters XIII (Quarters) and XV (Ammunition Supply) have been transferred to the new Vol. I, and in their place we have Chapter XII on Orders and Reports, and Chapter XIII on Inter-communication. The remainder of the book appears in more or less the same form as before. There are also some new Appendices which will repay study.

There is much that is new in Chapter I. In Section 2 will be found a concise definition of war which indicates how the armed forces fall into their place in the national effort. Such a definition has never before been attempted in Field Service Regulations. There can be no doubt that it is a valuable addition from the point of view of soldiers in general.

Section 3 now mentions the Chiefs of Staffs' Sub-Committee of the Committee of Imperial Defence. This Sub-Committee was set up quite recently to ensure that there should be proper co-ordination of the three services. In the past it might, and in fact often did, happen that each Chief of Staff went to the Prime Minister with his own plan and that the three plans disagreed very widely. Now the Chiefs of Staff consult together in the first instance and only go to the Committee of Imperial Defence, or to the Cabinet as the case may be, when they have thrashed out their differences as far as they can be thrashed out. Ministers are thus more likely to get a joint service opinion than three divergent opinions. The new procedure seems a much more practical proposition than another of which we are constantly hearing—namely, the setting up of a Ministry of Defence to control all three services.

Section 4 is almost entirely new. It contains an important statement of the various ways in which a war can be won. The old F.S.R. contained the rather misleading dictum that "the military aim in war was the destruction of the enemy's main forces on the battlefield", and left it at that. Of course armies are never destroyed in modern war—a victory may be gained when the enemy has lost no more than one per cent., or even less, of his effectives.

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The new section is based on history and seems to deal very comprehensively with the various ways in which an enemy can be defeated.

Section 5, which deals with the command of military forces, is well worth the study of every officer. It gives us an ideal which we can at least keep before us, even if we cannot attain it. It is to be noted that more emphasis is now laid on the necessity for subordinate leaders being ready to accept responsibility.

Section 7, which deals with the Principles of War, has been re-drafted almost entirely. The writer has heard it remarked that "although we are told that the principles of war are unchanging, the War Office never brings out a new manual without having a cut at them." But the principles are still here in the new book as we knew them before. What has been done is merely to set them down more fully and more clearly than in the last edition. The headings under which the principles are arranged are to all intents and purposes the same, with one exception which is more apparent than real. The old principle of the "Maintenance of the Objective" has been taken out of the list and given a special paragraph of its own under the heading of "The Object." It has been entirely re-written on much broader lines than before, and it is now to be regarded as a general over-riding principle.

A point that must occur to us in considering this section is that mechanization and the introduction of armoured forces have not affected the great principles of war—they are as true to-day as they have always been. It need hardly be said that these principles apply to the handling of artillery and to the application of artillery fire just as they do to the employment of armies. As it is now put in Section 7.1. "The principles of war must be given full consideration whether it be in the preparation of a plan of campaign or in determining the action of a unit on the battlefield."

The principles of war come in for considerable criticism now-a-days from various quarters—in fact articles on the subject are constantly appearing in service journals. No doubt this new Section 7 will not be immune from attack. It is of course easy to suggest various ways of rearranging the principles on a more scientific basis. It is however doubtful if any advantage is to be gained by putting them in a more academic form. As they are now

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set down in F.S.R., the principles seem to be in the shape that is most useful to us; they have stood the test of practical experience in that form. What we must of course bear in mind is that "their relative importance and the method of their application is constantly varying." (Sec. 7.1).

Chapter II reveals a noticeable re-adjustment of the relations between the arms. Section 10, which deals with infantry, carries still further the idea which was indicated by the amendment to the 1924 edition. We must no longer regard infantry as the Queen of the Battlefield. The sentence which read "Infantry is the arm which in the end *wins* battles" has disappeared. The point which will interest gunners most is that infantry is to be considered as more dependent than ever on superiority of fire in face of even slight opposition. Infantry can now produce a greater measure of fire power than before by means of their machine guns, but this is not enough in itself. Gunners must be more thorough than ever in their preparation of fire plans for the support of infantry in both attack and defence, and these fire plans require more careful co-ordination than before with the fire of machine guns and other weapons. The foregoing remarks also apply to a great extent to the new instructions regarding cavalry action—in face of opposition cavalry will rely more than ever on efficient artillery support.

Section 13 indicates that tanks are now to be considered, as already mentioned, as falling into three classes—medium, light, and close support, each type having a distinct function of its own. The tank which will interest gunners most is the close support tank, which is intended to accompany medium and light tanks in battle and to support them with gunfire and by producing smoke clouds. This tank will relieve the artillery of a duty for which our present equipments are quite unsuited and which we could not carry out efficiently in war. The ordinary artillery support of tanks will, of course, still be required—it is of *close* support only that we have been relieved. Section 13 also contains short instructions for the handling of armoured units and this is developed in later chapters. It is to be noted, however, that F.S.R. is still very cautious in its references to armoured units—which is as it should be since they must still be regarded as experimental.

Section 15, read in conjunction with Section 31 and later

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sections, gives much more definite guidance than the old book with regard to the handling of aircraft. It contains a clear statement of how the various types of aircraft—fighters, bombers and army co-operation machines—should be used. It is laid down what types should normally be used for the various kinds of reconnaissance—close, medium and distant, and we are told how tasks should be allotted. The responsibility of the army is now clearly defined; there should be no doubt in future about what the soldier must do and about how much he should leave to the airman. We now find, too, clear instructions about the kind of orders the air force expect from the army for both reconnaissance and bombing. This is all new and it is of great importance. If we do not know the functions of the various types of aircraft and understand how to convey our wishes to air force commanders, we shall not get what we want from them. The actual work of co-operation with artillery remains as before. It is to be noted, however, that the number of aeroplanes available for artillery observation has been reduced, since an army co-operation squadron is now to have twelve aeroplanes only. It is to be hoped that the number of squadrons may be increased in due course to compensate for this.

The sections on smoke and gas are worth the attention of gunners. Section 17 describes the various types of gas-shell bombardment by artillery. We should know about these because no one can say, in spite of international agreements, that gas will not be used by an enemy.

Chapter III, which deals with strategical preliminaries to joining battle, has been largely re-written. It does not, however, affect gunners directly to any great extent.

The next five chapters deal with the various phases of the battle, and here gunners have the advantage of having been ahead of the old F.S.R., Vol. II. Practically all the references in these chapters to the action of artillery in battle have been reproduced from the 1928 edition of Artillery Training, Vol. III, which of course had just been published when the revision of F.S.R., Vol. II was taken in hand. It is, however, necessary to study F.S.R. in order to obtain a *complete* picture and to understand the action of all arms in co-operation.

In Sections 23 and 40 the influence of the artillery in the

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approach march and in advanced guard actions is emphasized more heavily than before. If opposition is encountered during an advance the correct action is not to deploy more infantry but to bring up artillery and tanks. In Section 40 it is now stated that the whole of the divisional artillery may sometimes be brought into action to support a small advanced guard. If the main columns are not to be delayed in an action of this kind, the artillery must therefore be well forward in the line of march and must be able to put down co-ordinated fire quickly.

In Chapter VI the most important features are the new instructions on the employment of mobile forces and divisional cavalry, and the simplification of terms in connection with outposts. Mobile forces are mentioned in the general chapter on Battle (Sec. 23) and in Chapter VI they are dealt with in some detail in Section 37. These mobile forces will consist of cavalry, armoured cars, and perhaps tanks, and they will have aircraft to co-operate with them. Although they are discussed in the chapter on Protection it should be remembered that very often their primary task will not be a protective one; the fact that they are operating ahead of the army, however, will automatically give some degree of protection to the columns behind. It is because they cannot be relied upon for *local* protection that cavalry has now been made a permanent part of the division of all arms. A point to note is that the old "cavalry screen" is dead.

The use of the divisional cavalry regiment is discussed in Section 38. It is to be noted that this regiment is not to be invariably allotted to advanced guards and other protective detachments, but that it may be handled by divisional commanders or, on occasion, by corps commanders themselves. The pros and cons of the various methods of employment are set out in this chapter.

Read in conjunction with Chapter VIII, Sections 48 *et seq.* indicate that a wider meaning than before has been given to the term "outposts". It is still to be used in its old sense to denote the troops which protect the main body during a halt, and it is now also to be used in a new sense to denote the troops in contact with the enemy in defence. The terms "piquet" and "support" have disappeared (as was foreshadowed in the 1929 edition of Cavalry Training, Vol. II), and what we have to bear in mind now is that

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dispositions for an outpost action are similar to those for an ordinary defence although the troops will be more widely disposed on the ground. The new arrangement should do much to prevent the confused thinking that used to be so common in attempting to distinguish between an outpost action and defence when, in fact, there was no difference—in principle at any rate. What used to be called a "piquet" will now be called a "post" as in defence. The forward posts will provide sentry groups, sentries and patrols, just as they do in defence. What used to be called a "support" will now be the company or squadron reserve, and its role will be as before, namely to cover the flanks of the forward posts with fire, to make immediate counter-attacks, and to reinforce threatened points.

In Chapter VII (Attack) it will be noticed that the old terms "encounter attack" and "deliberate attack" have been discarded. The attack under the conditions of mobile warfare is now to be regarded as the normal case; the later sections of the chapter deal with the special conditions of an attack on an organized trench system. Similarly in Chapter VIII (Defence) the term "position warfare" has been dropped and this form of operation is now referred to as "protracted defence". These changes are merely changes in *names*, for the new teaching is substantially the same as before. They are all to the good, because the new terms are not so apt to imply that the principles of attack and defence change in different types of fighting. Besides, there is a natural disinclination to read anything which is labelled "position warfare". And it is important that these sections should be read. Although we train mainly for mobile warfare, no one can say that we shall not be faced again with the problem of breaking through, or of holding, a strongly fortified position. We find in the new sections a record of the lessons we learnt so hardly in the Great War. If we are to avoid a repetition of the failures at Neuve Chapelle and Loos and in so many other operations between 1914 and 1918 we must study these portions of the book.

Section 80.5 gives the role of outposts in defence as follows: "Outposts for the purposes of protection and giving warning of attack will be located in front of the foremost line of defended localities . . . . Outposts, like any other protective troops, may

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have to resist and break up the enemy's attack . . . . or they may be withdrawn as soon as it is definitely known that the attack is imminent".

Section 88 describes how outposts are used in protracted defence; they take the place, in that form of defence, of what was called the "forward zone" in the 1924 edition.

The new instructions in Chapters VII and VIII with regard to fire plans are of special interest at the moment. Section 62 deals with the gaining of contact. Para. 6 lays down the role of the artillery in this phase. It reads: "Bold and vigorous action by the artillery is essential; wherever possible fire will be directed by observers who can watch the progress of the infantry. An issue of detailed orders to the artillery will not usually be possible . . . ." and so on. This is very clear—and yet it is to be feared that the guidance we get here is not always followed. Slow and complicated methods are to be avoided at this stage. Time is of the utmost importance, because any delay will be used by the enemy to strengthen his defences. Sections 63 and 64 go on to deal with fire plans for a main attack. Section 63, para. 3, makes a point which did not appear in the old edition—namely that, owing to its ability to switch fire from one target to another, artillery, even when in action, may be considered as a form of reserve in a commander's hand. Artillery, in fact, is the only arm which is not fully committed once it is engaged. This is a quality which makes for flexibility and it is one that we should remember to use when we frame our fire plans.

Section 63.5 is important. It says that "if the enemy's morale is high and he is disposed in depth, even though he has not prepared fixed defences, infantry *cannot* succeed unless the fire of the defence is kept under subjection by superior fire power. It is by such superior fire power and not by men's bodies that success is won."

Section 64 deals with fire plans in some detail, and describes the various forms of artillery support and their correct use, i.e. barrages, concentrations, smoke screens and so on. It also emphasizes the need for close co-ordination of our fire with that of other weapons—in particular machine guns. It is therefore important for us, as gunners, to know how machine guns are handled, and it is useful to find this described in some detail in Section 65.

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A long section, 66, is devoted to the artillery in the attack.

The point to note is that the bulk of this chapter on Attack is devoted to the handling of fire power. The tendency in modern warfare is to lay greater and greater emphasis on the importance of fire. The French even go so far as to say: "The attack is fire which advances, the defence fire which stops." The artillery provides the most powerful means of achieving fire superiority, and our responsibility for its correct handling is greater than ever before.

F.S.R. does not actually tell us not to shoot our own infantry, but we may take it that this is implied! Short shooting at practice camps is comparatively immaterial. But it need hardly be said that if this kind of mistake is made in war we shall kill our own men. In some cases short shooting—and bad shooting generally—is due to negligence, but in a great many others it is due to choosing an unsuitable method of putting down fire. The conclusion drawn by the writer is that every artillery officer must know the degree of accuracy he may reasonably expect from any given method under any given conditions, and that he must be quite frank about it with himself and with the troops he is supporting. If we think that, owing to lack of time or for some other reason, it is dangerous to use certain methods on certain occasions, then we must say so. Readers of this paper will have seen neglect of this frankness lead to the kind of shooting that would be disastrous in war. We have to remember that some of the rather complicated methods we learn in peace time are liable to become very dangerous weapons in the hands of average brigades and batteries which have been hurriedly made up to war establishment—if these methods are used on the wrong occasions. There is a time and a place for everything, and methods that may be quite safe and very effective when we have time and good communications and well-trained personnel, may be positively harmful when these conditions are absent. There is a great temptation in peace to develop highly complicated procedure, but we must bear in mind that everything that is not quite simple goes by the board very quickly in war—especially in mobile war. It is not suggested of course that we should not take advantage of scientific developments, or that we must not train ourselves to the highest degree of efficiency possible. It *is* suggested

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that we must keep this need for simplicity before us; and that in each situation we should ask ourselves whether the action we propose to take and the methods we propose to use are sufficiently simple to be reasonably sure to bring about the result we require. The time available is of course a governing factor. The point is summed up in Section 66, which says: "The artillery plan *must be simple*, and will be largely governed by the time available." Many other references will be found in the new F.S.R. to the need for simplicity.

In the chapter on Defence we again find that fire power is the dominating consideration. The note is sounded at the beginning of the chapter in the section which deals with the choice of a defensive position. Section 78.4 says: "The framework of the defence will be the artillery and the machine guns", and again "the machine gun fire plan will be decided before the siting of the defended posts is determined in detail".

A point that is new is that it is now definitely laid down that in open country the increase in machine guns and the provision of anti-tank weapons will enable troops to hold greater frontages than before, the gaps between the defended localities and posts being held by fire alone.

As mentioned above, the instructions for handling artillery fire in defence are in conformity with those contained in Artillery Training, Vol. III. It is perhaps worthy of mention that the new instructions on anti-tank defence confirm the teaching of Artillery Training—which means that gunners must still resist demands for the allotment of guns to forward anti-tank work.

There are two further points which might be mentioned in these very important chapters on Attack and Defence. The first, which is quite new, is indicated in Section 64.14 which says: "In the event of the attacking troops failing to penetrate on any part of the front of attack and of the advance being definitely held up, the leading infantry will entrench themselves. It will be the duty of superior commanders to decide how far the ground gained is to be retained. Excessive losses should not be incurred in order to hold ground which, though it has been gained, is subsequently found unsuitable". This question of holding ground gained is one that has always caused much discussion. One has heard it con-

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tended that it is dangerous to put it in writing because it may lead to unit commanders not pushing on to the utmost of their ability, or not consolidating their positions when hard pressed. The new instructions meet this contention satisfactorily, since it is clearly laid down that the responsibility for giving up ground rests, in normal circumstances, with the superior commanders.

The second point is in connection with a section of the old edition which led, rightly or wrongly, to much misunderstanding—namely that dealing with the responsibility of the various commanders for the organization of a defensive position. Readers of this paper will remember the very animated discussions upon "the line in front of which the enemy was to be stopped". This difficulty seems to have been dealt with in the best possible way. The contentious phrase is nowhere to be found in the 1929 edition. What we do find is a very clear paragraph (Sec. 80.3) which lays down exactly what each commander, from the army commander down to the commander of a unit, has to do in defining the ground to be held in defence. If this is read in conjunction with Section 5.3 which states that "a commander is responsible for making his intentions clear to his subordinates", further confusion should be avoided.

Chapter X (Warfare in undeveloped and semi-civilized countries) has been very much cut down; detailed instructions regarding mountain, desert and bush warfare must now be sought in separate publications. The preamble (Sec. 106) to the new chapter is, however, important. This has been brought up to date and contains several new features. Amongst these may be mentioned the paragraphs dealing with the action of aircraft. Claims are constantly being put forward to the effect that an air force can settle a dispute with an uncivilized enemy more quickly and effectively than an army. We find in Section 106 a carefully considered pronouncement on the question which tells us exactly how much may be expected of aircraft in savage warfare.

The remaining chapters have all been re-cast and they contain details of interest to staff and regimental officers alike. Among new points may be mentioned the instructions in Chapter XI regarding the movement of mechanical units; the rules for writing operation orders, messages and reports in Chapter XII (which

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supersede those in the Field Service Pocket Book); and the instructions for intercommunication in the field in Chapter XIII.

In this review of the new F.S.R., Volume II, it has not been possible to mention everything that is new. An attempt, however, has been made to indicate features of special interest to the Regiment. It will be seen that there has been no very great change of doctrine. But in several directions there have been important new developments. A number of points, too, that were obscure in the last edition have been successfully cleared up. It will be generally agreed that the 1929 edition of our most important manual represents a distinct improvement on anything we have had before.

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THE 'HONOUR' TITLES OF BATTERIES IN THE ROYAL REGIMENT OF ARTILLERY.

By Lieut.-Colonel J. H. Leslie.

(Continued from Vol. lvii, p. 245.)

III.

'WATERLOO'—*continued.*

Footnotes 1 and 2 on page 245 should be cancelled and the following substituted in their place.

1. Not present at Waterloo, but authorized by Army Order No. 112 of 1901 to "carry on the traditions of" the 2nd Rocket Troop, reduced in 1816.
2. Not present at Waterloo, but authorized by Army Order No. 112 of 1901 to be considered as "D" Troop, Horse Artillery (reduced in 1816) re-formed.

WITH reference to the inclusion of 82nd Field Battery, R.A., in the table on page 245, as being entitled to the 'Waterloo' battle-honour, the following question has been asked:—

"Surely Alms's Company is now 42nd Field Battery and not 82nd?"

The answer is that Captain Alms's Company had no connection whatever, at any time, with what is to-day known as 42nd Field Battery. Captain S. Bolton's Company of the 9th Battalion, R.A., which is now (1930) represented by the 42nd Field Battery, was not present at Waterloo, and did not land in Belgium until 30 June, 1815—12 days after the battle.

Captain Bolton, however, was serving in Belgium at the time, having just been promoted from the rank of 2nd Captain, in "F" Troop, R.H.A. He had not then joined the Company in the 9th battalion to which he was posted on promotion. This Company was stationed at Waterford, in Ireland, in June, 1815. (See original Muster Rolls in Public Record Office—W.O. 10/1115).

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Bolton remained in Belgium and commanded the brigade of guns in the battle to which Captain Alms's Company was attached.

The mistake in crediting 'Waterloo' service to the 42nd Field Battery is due to the fact that it has been assumed by every writer about the battle that Bolton was in command of his own Company, in the 9th Battalion, at the time, whereas he was actually in temporary command of Captain Alm's Company, belonging to the same battalion. This is no matter of opinion. It is proved, beyond doubt, by the original Muster Rolls and Pay Lists of the two Companies now in the Public Record Office, London.

IV.

'THE ROCKET TROOP.'

"O" Battery, R.H.A.

This Battery was originally formed on 1 January, 1814.

It is necessary, by way of introduction, to give a short sketch of Captain Courtenay Ilbert's Company, 5th Battalion, Royal Artillery, from the previous October, in that some of the non-commissioned Officers and men who belonged to it, and who were at that time serving in France (Peninsular War) were transferred, *en bloc,* to the 1st Rocket Troop—now (1930) "O" Battery, R.H.A. (The Rocket Troop) on its formation, as the 1st Rocket 'Brigade'.

The services of Captain Courtenay Ilbert's Company, 5th Battalion, Royal Artillery, in the Peninsular War are somewhat complicated, but from the Company Muster Rolls (Public Record Office, W.O. 10/971) the following facts are deduced:—

a. On 3 October, 1813,

2nd Captain Henry Bowyer Lane
1st Lieutenant John Crawley
2nd Lieutenant Evan Morgan
6 N.C.O's and 50 Gunners

of the Company embarked at Woolwich to join Wellington's army then serving in Spain. Captain Ilbert was at the time on voyage to England from Canada.

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b. The place and date of disembarkation in Spain, or France, are not recorded, but in the Muster Roll for November (P.R.O. W.O. 10/977) the Company is shown as being quartered at Urrugne (South of France, about 2 miles S.W. from St. Jean de Luz).

c. The men of Ilbert's Company who remained in England were attached to, and mustered in, a Detachment at Woolwich, commanded by Lieutenant and Adjutant P. D. Stewart, R.A.

d. The Officers and men of the Company who went to Spain in October 1813, were certainly considered to be the headquarters of the Company, seeing that the Muster Rolls for November and December, 1813, are signed by 2nd Captain H. B. Lane, in France, with the full establishment of the Company shown, those N.C.Os. and Gunners who were not in France, having "England" entered against their names.

e. The names of Lane, Crawley, and E. Morgan—see *ante*, para. *a.*—appear for the first time in the Monthly Return of Officers "present with the army" in France and Spain, dated 25 December, 1813. (P.R.O.—W.O. 10/1814).

f. Major (Bt. Lieut.-Colonel) A. S. Frazer, R.H.A., wrote from St. Jean de Luz on 24 December, 1813:—[1]

> "Captain Lane, of the Artillery, has arrived at Passajes,[2] with a rocket detachment of fifty men, but no horses. Lord Wellington has permitted a division of the rockets to be tried. The division means two carriages of rockets, of which each carriage conveys about fifty rockets, and there will be a couple of carriages in reserve."

g. Early in 1813 a Rocket "Brigade", i.e. "Troop", had been formed at Woolwich. In December of the same year another was in course of formation, also at Woolwich, under the command of Captain William Granville Eliot, R.A.

h. These two "Troops" were attached to the "Horse Brigade", (i.e. to the Horse Artillery) and were mustered as such on 1 Jan-

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[1] Letters of Colonel Sir Augustus Simon Frazer, K.C.B., etc., Longman, Brown, Green, Longmans and Roberts. 1859.

[2] A small land-locked harbour on the N. coast of Spain (Guipuzcoa) about 5 miles due E. from San Sebastián.

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uary, 1814, the one which was formed first being known as the *Second* Rocket "Troop", and the one of later formation (January, 1814) as the *First* (Eliot's).

i. We read in the "Dickson" MSS., No. 376 of 1813—p. 1151—that "The Detachment going out[1] under Captain Eliot, and that serving in the Peninsula, under [2nd] Captain Lane, are to be formed into one "Troop", etc.

j. In consequence of this new formation, the 6 N.C.Os. and 50 Gunners of Ilbert's Company—see para *a.*—who were in France under Lane's command, were transferred to Eliot's Rocket "Troop", with effect from 1 January, 1814—vide Muster Roll. They are shown in the Muster Rolls of Eliot's Rocket "Troop" from this date onwards, as "in France". They joined Eliot's "Troop" at Woolwich in July, 1814, on their return to England, at the conclusion of the Peninsular War.

k. 2nd Captain H. B. Lane and 1st Lieutenant J. Crawley were also transferred to Eliot's Rocket "Troop".

l. 2nd Lieutenant E. Morgan was transferred to Captain H. Trelawney's Company, 5th Battalion, R.A. He remained in France, however, attached to Lane's Rocket "Division", and is shown in a Return, dated 24 March, 1814, as "doing duty with the Division".[2]

m. The portion of Captain Ilbert's Company which remained at Woolwich in October 1813 (see *ante*, para. *c.*) and which Ilbert joined from Canada in November, became the headquarters of the *Company.*

n. "O" Battery is certainly entitled to "Peninsula" as war Service, although it has not been shown hitherto.

From this somewhat complicated story, it will be seen that in 1814 two "Rocket" Troops were in being, the one of first formation being called the "2nd Troop", and that of later formation—January, 1814—the "1st Troop"—a quite illogical arrangement, which has never been explained.

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[1] To Holland.

[2] "Monthly Return of Captain H. B. Lane's Rocket Division, Royal Artillery". *The Dickson MSS.* No. 180 of 1814.

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When in 1816 army reductions came into fashion, the 2nd Rocket Troop was, naturally, the victim, and so the Troop, with 'Leipsic' and 'Waterloo' service to its credit, disappeared.

As the question of this reduction in 1816 is even now constantly raised, it is well to place on record a note of explanation.

The original Muster Roll of the Troop, dated at Woolwich, 1 July, 1816, will be found in the Public Record Office, London (reference W.O. 10/1165). It is headed :—

"Major Edward Charles Whinyates's 2nd Rocket Troop".

There is a note on it as follows :—

> "This Troop was broken up in July and nearly all the men transferred to Captain W. G. Eliot's 1st Rocket Troop".

By Army Order No. 112 of 1901 "O" Battery, R.H.A., was authorized to "carry on the traditions of" the reduced 2nd Rocket Troop, and in 1926 the subsidiary 'honour' title

"The Rocket Troop"

was granted to it.

(To be continued.)

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A SUGGESTED COMPROMISE BETWEEN MUTT AND JEFF.

By Lieut.-Colonel A. J. Farfan, D.S.O., O.B.E., R.A.

ANYONE reading the discussion between Mutt and Jeff in the April number of the Journal could not but help admitting that there was a great deal of sound reasoning in the arguments of both of these able officers. The question therefore naturally arises whether a satisfactory compromise could not be effected between the two? Let us therefore, on the one hand, agree with Jeff that concentrations will on occasion be required—even Mutt has grudgingly to admit this—and with Mutt on the other hand, that the concentration of four batteries is a slow and laborious process and that we are not utilizing to the full the quick-firing properties of our equipment. In the case of our agreement with Mutt, however, we will make the reservation that we think that only one battery firing, especially on a target possessing considerable breadth or depth, is rather on the thin side. If we can suggest a compromise whereby a concentration of at least two batteries—twelve 18 prs., or six 18 prs. and six 4·5 howitzers (no mean concentration)—is assured in the same time as it normally takes a single battery to engage a target, it is hoped that the honour of both Mutt and Jeff will be satisfied.

As everyone agrees, the main difficulty of Brigade Concentrations lies in the telephone communications. This difficulty is due to the fact that the four batteries of the brigade have to be distributed in breadth and depth. The French groupe—12 guns—can put down a concentration very quickly because the three batteries of the groupe are always close together, distribution in breadth and depth being obtained by staggering groupes and not batteries. Can we not learn something from the French and "groupe", or, let us say "couple", two of the batteries of the brigade—12 guns, as in the French groupe—while still retaining the necessary distribution in breadth and depth with the other two batteries? It is suggested that a deployment of the brigade as shown in the following diagram would meet all requirements.

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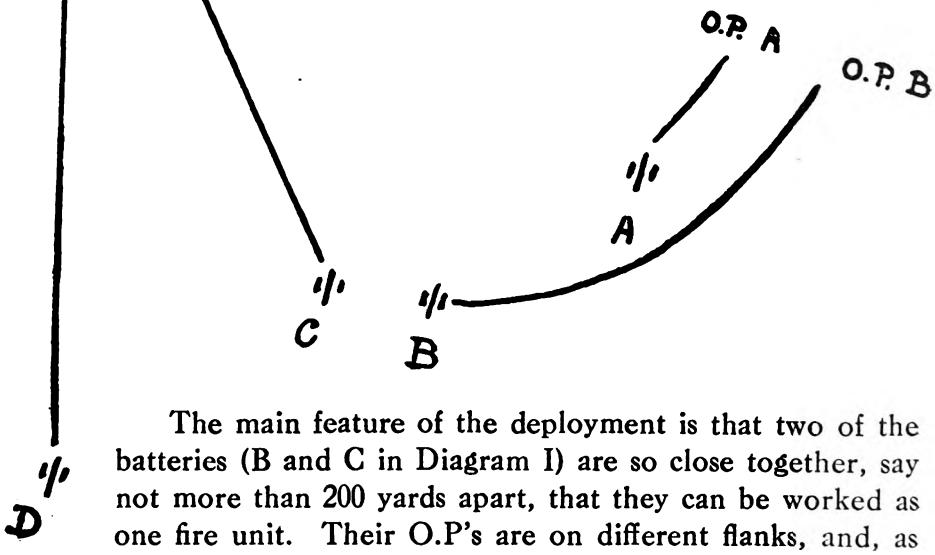
DIAGRAM I

A, B, C, D, are the four batteries of the brigade. Brigade communications are not shown.



The main feature of the deployment is that two of the batteries (B and C in Diagram I) are so close together, say not more than 200 yards apart, that they can be worked as one fire unit. Their O.P's are on different flanks, and, as B and C Batteries are to be the *pièce de résistance* for our concentrations, let them be the best O.P's. The G.P.O's of these two batteries are either within megaphone distance of one another or connected by a short telephone line independent of the brigade telephone system. (This is considerably simplified if the G.P.O's are on the inner flanks of their batteries.) Any line and range given to one battery can be readily converted into the line and range for the other battery of the "couple". For instance, if B Battery has its zero lines laid out on 170 Grid and C Battery on 190 Grid, then 6 deg. right of C's zero lines will be 26 deg. right of B's zero lines (plus or minus displacement correction). Similarly the range for B is merely a question of displacement correction. (The displacement corrections are, again, considerably simplified, and often negligible, if the pivot guns of the "couple" are the inner flank guns.) A concentration of twelve guns can now be put down very quickly on to any target visible from either O.P. B or O.P.C, which, be it remembered, are the best O.P's. If we now go further and have, say, the O.P. of A within easy access (by megaphone or even runner) of O.P. B, and the O.P. of D within

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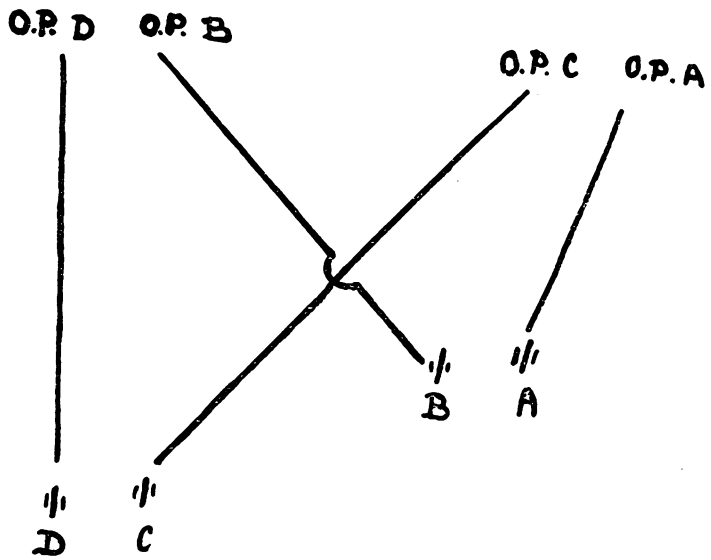
easy access of O.P. C, we can put down, at very short notice, a concentration of not two, but of three batteries, on any target visible from any O.P. The brigade telephone system in the meantime is free for tactical orders, administrative orders, communication with F.O.O., etc., or, if necessary, to get the fourth battery of the brigade on to the concentration. Further, advantages claimed for this system of deployment are:—

(a) It simplifies survey. The brigade survey party have only to fix bearing pickets for three batteries, as it were, instead of for four.

(b) There is economy of cable and simplicity in the brigade telephone system. The brigade exchange is installed at the coupled batteries' position and lines run out to the other two batteries.

If we go still further and have two pairs of coupled batteries, and their O.P's in pairs, as shown in Diagram II, rapid concentrations of all four batteries on to any target visible from any O.P. become an absurdly easy problem. The brigade telephone system also is much simplified—the exchange is installed at one of the couples and, with a line run out to the other couple, the four batteries are connected.

DIAGRAM II.



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THE COLONEL DREAMS AGAIN!

(ANON.)

THE old Colonel was dozing in his armchair. The habit had grown on him of late, and it was seldom that an evening passed without his having a snooze. He was fond of reading and selected his books with discrimination. His fortnightly bookbox from London always included, in addition to the latest novels, books on sport and travel, to remind him of the wanderings of his more active days. On this particular evening he had been reading an interesting and exciting account of a polo match and this, no doubt, induced the following dream.

It was a winter's evening in Northern India and he was standing in the bar of the Chutter Munzil Club at Lucknow. Here he found himself listening without effort to some conversation between two neighbours who, like himself, were engaged in partaking of the usual sundowner. These two men were apparently quite oblivious of his presence and although he did not actually know them, he recognized them at once as two of the Lancer polo team which that afternoon had got into the final of the open cup. One of them was saying: "A really good show the Gunners put up to-day. A big surprise their beating the 22nd. No one could have expected them to get into the final against us. A useful hitter their No. 3 and looked well mounted, but they tell me he doesn't like being bustled. Now, for the final on Saturday, it is of course your job to see to it that he is well bumped and do not be afraid of mixing it up a bit rough—you know what I mean"! "You leave him to me" the other answered. "I watched them play to-day. They simply play up to their 3 all the time. With him properly marked they would be no earthly use", and on these lines the conversation went on, the gist of it being that the Lancers meant to make a dead set at their opposing 3 and so dislocate the Gunner team. As our hero was the No. 3 in question it gave him something to think about. He therefore withdrew in silence from the bar and took a stroll along the edge of the River Gumti to think.

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In his own heart, and without any conceit, he knew that if he was well marked his side, which he had nursed and trained so carefully, could not do much good. He was the one goal getter in the team, and by far the best man in it with his stick. He also knew, alas, that he did not like being bumped. He had some excuse for this, as a bad fall some years before had jarred his spine and any sort of a "rough house" made his head ache horribly. So they were going to make a dead set at him on Saturday! Well, what could he do to counter this?

For the hundredth time he went through his side. At No. 1 there was Clayton, a strong horseman, keen and determined, the sort to really worry a back, as we are talking of the days when the offside rule was in force. He was a fair hitter and a much improved player, but still lacked experience of fast polo. He had done a lot to win the semi-final that very afternoon and had given his opposing back a very hard time of it. Then No. 2, Charles Johnson, the weakest man in the team, but on his day, when things went well, a very useful hitter, not overfond of doing much work in the defence. Then himself at 3—he was the only one who had played much first-class polo, and the criticisms of his play that he had overheard in the Club were, he knew, very true ones. In his heart he knew that he disliked a rough game but he could not help that; and he supposed it was the fact that he had taught his side to play up to him all the time. Then at back, his best friend, John Taylor, a splendid man in every way, but, on account of his size and weight, rather slow, was however a really fine hitter when he had plenty of time. He knew they were all as fit as fiddles and the immense amount of practice they had put in since last cold weather had improved them as a team four or five goals at least. As regards ponies, they had spared neither trouble nor expense in procuring the best possible. They, too, were as fit as they could possibly be. Their real disadvantage was that as a team they were short of practice in fast polo. At their small station there were few players outside the Artillery Brigade to which they belonged. The result was that most of their practice games had been played with the team split up and the next best players available brought in, a state of affairs not conducive to good combination. Playing as a team at Jullundur they absolutely swamped everyone else there.

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He knew, too, that their victory that afternoon, unexpected as it had been to everyone, had been a comparatively easy one. For himself, he felt as though he had hardly played at all, but when he thought of the final his heart sank. The Lancers were one of the best teams in India, and they always adopted the same tactics. From the moment the ball was thrown in, they went absolutely all out, trying by rush tactics to demoralize their opponents and win the match in the first chukker. He shuddered to think what the score might be. How could his side stand such a hustling? Then if he himself was completely marked by James, who he knew to be a rough and violent player, always riding great big ponies, only one thing could happen. His team must disintegrate. It was an awful thought. Try as he could he was unable to see any solution. He had watched the Lancers play in the two previous ties and could not disguise from himself that they were a far stronger side than his own.

Sadly he returned to the Club. Stepping into the bright light he was immediately accosted in a most friendly manner by a perfect stranger. "Hullo, Charles, surely you remember me?" The answer could only be "No". "I am sorry" said the stranger, "but aren't you Johnson?" "No", said our friend, "but of course I know him well. We have come up together from Jullundur to play polo. My name is Mainwaring". "How extraordinary" said the stranger. "I am Pringle, a Sapper, and I was at the Shop with Charles. Haven't seen him since, but if you will forgive my saying so, you are rather like him". "Well", said Mainwaring, "there must be a resemblance, as you are not the first person to mistake us." Then the real Charles arrived and greeted his old friend of the Shop days.

On the way back to the Mess, Mainwaring was very silent. Could he reorganize his team so that he wouldn't be marked by James? No, that was impossible. It was too late to change, besides Charles was too weak for 3. Then there was the coincidence of their being taken for each other. Was that going to help? He couldn't see how. Somehow this mistake of Pringle's kept recurring in his mind. In the night he woke up and thought about it and it was then that a possible solution dawned upon him. Could he definitely change places with Charles as and when he liked with-

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out the formidable James spotting it? His team, at his own wish, was one of the first to wear the numbers of their places on a large white linen square on their backs. Supposing he and Charles changed numbers between chukkers? With their apparent likeness perhaps this would help. It certainly could not last for the whole match. Would it succeed for a chukker or two if the emergency demanded it. Rolling over he went to sleep and soon he was dreaming. He saw his team playing and noted the score. They were two goals down. Watching the players he noticed Charles with a large 2 on his back and then himself. He also had a 2 on his back. He was riding unmarked. He was striking the ball. He hit it a long way. There was cheering and the score board showed another goal. In the morning he completed his plans without telling anyone, except Charles. Charles had to be told as he had a heavy moustache and most of that had to come off to make it like his own, a sort of toothbrush affair! Then they compared their clothes, helmets, etc., making them also as much alike as possible. Finally, each procured an extra number cloth so that they could at short notice change from 3 to 2 or vice versa. The arrangements were now complete.

Saturday came at last, finding the Lancers full of easy confidence, the Gunners nervous and despondent. Anyone who has seen a polo match in Northern India on a perfect winter's day must be impressed by the beauty of the scene. The ground, a vast extent of level green turf. On one side the long row of ponies with their coloured martingales and syces in bright pugarees, the stand full of fair ladies whose frocks and parasols give a splash of bright colour to the general picture. The air is still and keen, the sun warm and bright and the sky without a cloud. It is hard to imagine a more perfect setting. The preliminaries are soon over. The players who arrive early examine each pony carefully, the fitting of bits and curb chains, the length of their leathers and in some instances they canter a pony or two about to see that all is well. Then the umpires ride out on to the ground, the players form up and the struggle commences.

With no definitely formed plan, the Gunners take the field—if "opportunity" presents itself, that is when an unnoticed change of places will be attempted. All eight players are keyed up for

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the game in prospect, the Cavalrymen expecting to go through their adversaries like paper, the Gunners resolved not to get rattled at the start. How easily such resolutions are made but how difficult they are to follow.

As soon as the ball was thrown into play, employing their usual hurricane tactics, the Lancers swept down the field. All through those long drawn out tense minutes of the first period, they seemed to be right on top of their opponents. Time and again the ball was hit behind the Gunners' back line, but fortune was protecting the goal itself. Shots that would have gone through were just intercepted or struck ponies. Others only missed the mark by inches, and, when the bell rang denoting that the time had come to change ponies, the score, which in no way represented the play, was 2 goals to nil. It might easily have been half a dozen !

It is not possible to describe the whole match in detail. At first, as already explained, the game appeared to be a ceaseless but rather ineffective bombardment of the Gunners' goal, but gradually it opened out. In the second period, the overwhelming superiority of the Cavalry was not nearly so marked as in the first. Thereafter, as the Gunners got used to the terrific pace and tactics of their opponents, the ball was kept travelling up and down the ground, each player marking his respective opponent as well as he was able. There was nothing to choose between the quality and pace of the ponies on either side. It was only the superior combination and knowledge of the game that kept the Lancers in front. Individually, as players, they no longer outshone their opponents, and the spectators were treated to a really high-class exhibition of good polo. The perfect state of the ground was conducive to long and accurate hitting.

Clayton at 1 was playing a marvellous game, never leaving his back for an instant and spoiling his game completely. Charles was in wonderful form and had scored two really brilliant goals. Our hero, bruised, bumped and knocked about incessantly by the savage James had not been very conspicuous, but had, on the few occasions he had been able to shake him off, managed to score twice. John Taylor had been caught napping more than once. His brain did not move fast enough for this sort of match. All the same he had played a splendid and untiring defensive game, saving

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The ball sped across the goal mouth hitting the far post.

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goals miraculously and often riding out to meet the ball between the posts. So, when there was only one more chukker to play, the score board read "Lancers 6; R.A. 4". This was the moment to try a change of places!

Hastily and unnoticed, Mainwaring had a spare No. 2 cloth fixed on to his back and when the ball was thrown in he formed up as No. 2. Charles, with his No. 2 cloth unchanged formed up as 3. The deep subtlety of the plan is now apparent, for had the two players merely changed places, each would have been marked by his respective opponent! But as both wore the same number and so closely resembled each other the two opposing players, who were responsible for looking after them, became completely confused. James could not find Mainwaring but seemed to see two Johnsons. When he tried to mark one of them he found his own No. 3 trying to do the same, in fact more than once they got in each other's way! The inevitable result was a temporary dislocation in the hitherto perfect drill and organization of the Lancers' team. Profiting by a moment of freedom, Mainwaring soon had a chance, and picking up the ball in mid-field, with a couple of half hits and a long straight drive he scored a goal. The tactics of changing places had been successful!

Riding back towards the middle of the ground, the Lancers tumbled to what had happened and James somehow spotting Mainwaring, probably by his pony, as he had a very quick eye for a horse, was determined not to be caught again. When the ball was thrown in, he rode straight for him, resolving not to leave him for a moment. The score is 6 to 5 and there are only three or four minutes left to play! Both sides made desperate efforts to obtain a goal, the ball being hit up and down the ground. Locked with James, Mainwaring seemed to have a chance of scoring, but the ball travelled to the right of the goal. Together they followed it at full speed, Mainwaring hoping to get in a backhander before it crossed the back line. They were too late! When the ball was within a foot of the line, reaching forward to his utmost, our hero hit right across his pony, bringing off a beautiful clean stroke. The ball sped across the goal-mouth, hitting the far post and bounding back across the line. SIX ALL, and the bell, which denoted that full time had been played, was ringing. A wonderful fluke, a chance

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of one in a thousand had come off. For a few moments the crowd could not realize what had happened and then there was a frantic outburst of applause.

After a few minutes' pause, the sides turned out to play extra time until one side scored a goal. James immediately attached himself relentlessly to Mainwaring, resolving at all costs to prevent his having a clear hit at the ball. The tremendous Gunner efforts were weakening and the ball was constantly in their half—two or three shots went only just wide of their goal. All seemed over. Then, almost in the centre of the goal-mouth, James relaxed his strangle-hold on Mainwaring to get a clear shot at the ball himself. By some miracle, Mainwaring reached it first, tapped it to the side and hit it again hard up the ground, following at full gallop on his beautiful Waler pony "Perfection", and managing to keep just clear of James, he drove the ball in front of him. About half way up the ground, he realized that James would catch him in a few strides. That meant one more hit and one only. Taking the ball right in front of his pony's forelegs, he leant forward and hit as he had never hit before. He struck it perfectly and just as a golf ball is hit from a tee it soared up and on, at first travelling across the ground, and then straightening out and swinging to the right it sailed on and, pitching in the mouth of the goal, it trickled over the line.

The match was over! For Mainwaring it was over before the ball crossed the line. The tremendous efforts he had made, the bumping and rough play he had received from James, had been more than enough for him. As the stroke was made his muscles relaxed and he fainted away. The wonderful "Perfection", knowing by instinct that something was wrong, pulled up gently, and just as our hero was falling to the ground, the umpire reached him, and with a friendly arm saved what might have been a nasty accident. Gently he was carried off the ground, to revive a little later while lying in the shade under the trees, to hear of his final achievement!

That night a polo dinner was held at the Club and was presided over by the Cavalry Brigadier. On his right, in the place of honour, sat Taylor, in place of Mainwaring, who was safely tucked up in bed, and on his left James, captain of the Lancers polo team. The

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Brigadier was undoubtedly a very attractive personality. Slight and well preserved, with keen blue eyes and hair only slightly flecked with grey, his handsome face was tanned dark by the Indian sun. He had been in his time the best G.R. in India, a well-known man after a pig, and a splendid polo player. He could therefore speak with undisputed authority on those sports which are so dear to the horse lover in India—a great asset to him. There was no speech making, but the health of the winners was drunk with great cordiality. After sitting down, the Brigadier was heard to say, "I visited Mainwaring this evening and found him very comfortable in bed. By the way, James, he told me how he had overheard you talking in the Chutter about your scheme of making a dead set at him. He told me too how he puzzled it all out and how the solution of changing places with Johnson was arrived at in a dream. The rest you know. I must say I think it was a very clever plan and possibly the only one which could win them the match". During this conversation James's face had been assuming a very sulky appearance, and when the Brigadier had finished speaking, he was distinctly overheard to say something about a "damned eavesdropper" and "foul tactics". Immediately a complete transformation came over the Brigadier's face. Looking directly at James he replied in clear incisive tones. "There is no question of eavesdropping. If your air your views in a public room before a stranger, he is absolutely at liberty to profit by them, and, as regards foul tactics, there is no rule in polo which prevents players in a team changing places during a match". James got up and left the room without a word. Turning again to Taylor, the Brigadier was soon conversing with him in his pleasant way, and all this time Mainwaring, the arch-conspirator, was sleeping serenely in his bed, entirely oblivious of the storm in a tea-cup for which he was directly responsible.

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SKI-ING.

PART I.

By Major (Bt. Lt.-Col.) S. R. Wason, m.c., R.A.

RECORDS of Sport in the British Army in past times have almost invariably been connected with horse and hound. Read novels about our wars from Ivanhoe to Henry Esmond and Charles O'Malley; they are full of tales of mounted sport and its terms. Read biographies of British soldiers and the story is the same. The matter-of-fact autobiography of Sir Harry Smith mixes the exploits of his horses and his greyhounds with gruesome accounts of the breaches at Wellington's famous sieges. The tradition has been carried on by their successors.

In this the Regiment has taken a large part. The delightful article in a recent "Journal" on the life of a subaltern in the eighties shows the spirit of those good days. In the period before the South African war hunting developed as the first recreation of the Regiment; similarly pigsticking became its special sport in India. Both had a most leisurely and favourable atmosphere. Riding and driving filled in much spare time, and time there was to spare. Even at the Staff College the student lived further away than has been approved since the War, and rode or drove to his work. After the South African war the excellent Gunner stations in Ireland brought up all who served there in the way that they should go, i.e., in the hunting of fox, stag and hare. Well run, but inexpensive packs of hounds, countries that called for clever rather than expensive galloping horses, and a succession of stalwarts at Remounts, who had the interests of the Regiment at heart, all helped to bring up the generation that formed the Royal Artillery in 1914. The subalterns of one Battery at Kilkenny, about 1905, with one private horse between them, got some 280 days hunting in one season.

Can we look forward to the next period and feel that this wonderful sport—hunting—will serve as well. We have surely the same faith in the contribution of sport to the "make-up" of the

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British officer; if it is not absolutely necessary to every individual, it is still the stand-by of the average, and has served us well in the past. A taste for a life in the open air, hard exercise for many hours in the day, and a spice of discomfort and danger that makes it worth our while.

Games and sports can hardly be compared. The best have an element of danger and something that calls for "nerve"—Rugby football for example; but such games leave one comparatively early in life. There is nothing like the horse and nothing to take his place; thank goodness his place will not be vacant for a long time. However, under modern conditions of soldiering things are certainly more difficult; the South of Ireland with its wonderful hunting stations is lost to us, there are more changes of station for most, more winter courses, perhaps more work Hunting has changed, faster horses are needed and the expense is greater. Perhaps partly as a result of this increased expense fewer embryo officers live in the atmosphere of equestrian sport before they join the Service, and again unfortunately, fewer are able to return to such an atmosphere when they go on leave. Can the place of the horse be taken in any way by such games as golf and tennis? However hard they are played can they do as much for the Regiment in the future as field sports have done in the past? Could a Sir Harry Smith grow up on such a training?

The mental side of the game-player's life may also be worth considering. If he is to be a good games player he must live continually in an atmosphere of competition. There are many however who maintain that games or sports should be a relaxation, and there is much competition in life in the Service anyhow. Some want more, and there are still loud and persistent voices asking for competitive practice; the "King's Cup" after all turns the practice of all the best of the Territorial Army Artillery into competitive practice. Perhaps in our recreations it is an advantage sometimes to get away from competition. Undoubtedly in this respect field sports have a great advantage over games. From a philosophical point of view it can hardly be denied that man is happier away from competition. For most people sports undoubtedly rise to their highest level both in the pleasure they give and in the way of recreation in proportion as the factor of competition is eliminated.

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Supposing it suddenly became clear that the horse's place was about to become vacant, no one would suggest that only one sport, game or recreation would fill the gap.

But "ski-ing" or "ski-running" is a sport of the first calibre; it has much in common with fox-hunting and, I am told, pig-sticking too. It is a sport that already claims large numbers of devotees in the Regiment, a many-sided sport that can fill this gap for some of us for a small period every year. There are other snow and ice sports, and very good ones; let someone else write about them, for there is room for all.

Ski-ing has many analogies with fox-hunting. It demands nerve, skill, judgment, and a quick eye for country. The due combination of dash and caution that helps one out hunting, to get and keep one's place in a good hunt, will also take one quickly and pleasantly down over the snow. Ski-ing might claim to be equal first with fox-hunting for giving the best all-round continuous exercise for a long day; a fit man can do his eight hours work—ski-ing—six days in the week. It can be enjoyed by the beginner—just as we have seen the enthusiast of the wash-ball seat revelling in his daily quota of falls. It repays in full measure the hard work necessary to attain proficiency. It can be made a most expensive sport by living in a Palace Hotel in St. Moritz, and buying innumerable tickets on expensive mountain railways, or for those who are lucky enough to be able to make full use of the splendid services of the real Swiss mountain guides. But it can also be done cheaply. We have one distinguished brother officer who came home on leave from abroad, and suffering misfortunes on the Turf, finished his leave at 5,000 feet in Switzerland as the most economical life open to him in his necessity; it can be done still. Ski-ing can be learnt at almost any age. It can be learnt from friends, from expensive teachers, even from books, and anyone who has to master 400 new pages of A.T., Vol. II, every few years knows how to learn a technical subject from letterpress. It is a most companionable sport. Yet its devotees are dependent on no one but themselves.

Ski-ing cannot really be enjoyed in the British Isles. I began to say "unhappily" but I struck that out, for anyone can benefit from contact, even of slight degree, with the inhabitants of the countries to which they may go to find snow. We may not be

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A Fast Turn.

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likely to find ourselves at war with or against Switzerland, but the most casual acquaintance with her military system and her officers cannot but make one think. Even her hundred-year-old "perpetual neutrality" does not cause her to give up her system of compulsory service and her efficient army; how closely this system is bound up with the life of the people is shown by the fact that when a man is called out for training, the Commune pays his separation allowances.

Very fine ski-ing is to be had in many countries besides Switzerland. Some of these centres are further away and hence entail a longer and more expensive journey, but against this the hotels are far cheaper. The Black Forest is however nearer. There are no real mountains to climb but the spring ski-ing is good. I will always remember the universal kindness one met there, even in the spring of 1914.

Without going further afield than Switzerland, however, one may meet fellow enthusiasts of all nations. I once got a tow from a tailing party on the Silva Plana to St. Moritz road. Behind a four-horse sleigh was a regular formation of people on skis. I joined on in the centre of the rear rank, between a Swede and a Spaniard, and was told there were, I think, eight nationalities represented in their party. It is almost worth while avoiding the very English hotels with the direct intention of meeting some of the very charming and friendly visitors from other countries. By joining local Ski Clubs one may also form such companionships. A good expedition together makes a fine introduction.

We are all very proud and many of us very respectful also of the wonderful record of the Regiment in the matter of interpreterships. Without aspiring to a serried row of capital letters after one's name in the Blue List, a smattering of foreign languages is useful to anyone. It sometimes takes a little effort and even brutality rather than tact to get one's foreign companions of the ski-ing expedition to speak any other language but their idea of English. One has, however, occasional bits of luck. One I had was in meeting a German who was a fine ski-runner, knew no English and liked speaking French, but he was talkative in any language. We once found ourselves on a very cold day in the shadow of the mountain we were climbing. He turned to me and

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said "We must stop talking now for this cold air is very bad for the lungs." But he only meant by this that *I* must stop talking, for he prattled away merrily till we got to the top. There he introduced me to "Quetsch" liquid fire of the "Kirsch" order, but very consoling that day.

Ski-ing has changed considerably since Switzerland first became a favourite place for winter holidays. The majority of those of us who skied before the war aimed at coming down hills straight and fast without much interest in technique or the number of falls we took. It may be that we have reached years of discretion but it is a fact that most people now aim at controlled speed rather than speed alone. Just as one rides out hunting under control, or drives a car at a manageable speed according to the road, so should we nowadays run downhill on skis, at a speed that allows one to deal with unforeseen obstacles. In racing there is a tendency to-day in the direction of no-fall races, though the standard has in any case become so high that falls inevitably put a competitor out of court in the best class racing. Here is another analogy with hunting. I once asked a well-known professional huntsman how many falls he took in a season. He said "If I take more than two or three, sir, I think I am very badly mounted."

Ski-ing as a sport has not a long history—say 25 years. It has made tremendous strides. It has its professionals in every country in Europe except our own, and ski-jumping—a professional sport—provides a real spectacle. Naturally it has developed on different lines in different countries. But we have much to be proud of in the part that has been taken in its development by the devoted British pioneers who have always kept their object clear before them—a free, pleasant and reasonably safe style of downhill running over every kind of ski-ing country and in every condition of snow. The Norwegians specialized in ski-jumping and in long distance runs; others perfected a means of downhill running sitting on a stick or using a long pole as a brake and means of support. But at the moment the British style of downhill running is the strongest element in the sport and has just achieved international recognition. It is a good answer to those who say the British are decadent in sport, to be able to show that this new sport has been developed in its best phase by a few individual holiday-makers while its merits

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were neglected by the inhabitants of the countries where it was indigenous or could at least easily be practised.

There is one bogey that cannot be neglected, and that is weather; though for that matter frost and foot and mouth disease stop a lot of hunting. The west of Switzerland especially, and particularly in December and early January, is liable to be short of snow at low altitudes and much disappointment has been experienced as a result. For those who can get leave later, however, spring ski-ing presents far more certainty of good conditions. The improved standard of ski-running also minimizes the bogey of lack of snow. Snow conditions that before the war would have been considered too bad for ski-ing are now treated as a rub of the green. As an example this year, no snow to speak of fell in the Parsenn district between 1st January and 16th February. But on 15th February we skied from the Furka to Jenaz right down to the station, (2100 feet above sea level); this is over 6000 feet of downhill running.

The one serious side of the matter at the moment is that ski-ing has not only become popular—it has become fashionable. One hears stories of schools in Paris where the turns can be learnt indoors on a prepared surface of boracic powder (I do not know if this is true); everywhere schools grow up, and clubs that are really schools, and the numbers that wish to ski increase faster than the bedrooms in hotels with central heating in suitable resorts. It does not take a Swiss, with a "Fremdenindustrie" prominent among his national activities, to see that money and more money can be made out of this. But though this is a serious draw-back to the individual it cannot be otherwise than a great recommendation for a sport—that annually it attracts more and more, male and female, and young and old, of every nationality in Europe.

I spoke of this as a many-sided sport. The first side is the best known because it has the greatest number of adherents. It is also the easiest. One stays for a given time in one hotel and does expeditions of varying length according to one's proficiency and staying power, almost every day. Most of these are along well-known routes which in a well-organized area like the Parsenn are marked. There are few arrangements to be made and no extras except perhaps railway fares to pay.

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For those who have never skied I will describe a typical expedition—the Mannlichen, which is done from Wengen, Murren or Grindelwald. A lot of the climbing in either case is done in a friendly mountain railway; from the two first-named places in the noisiest and most crowded express in the world—the Scheidegg Express, six miles per hour. From the Scheidegg an hour or so gentle climbing with enough steep uphill to make it worth while to put on skins (strips of sealskin on the skis to prevent slipping back) to the Mannlichen where the order is soup or boiled sausages according to whether or not one has brought lunch. Thence a descent of some 4000 feet to Grindelwald over a most charmingly varied line of country. Thousands of yards of beautiful open slopes where one may choose one's own line; run straight down these innocent slopes and any but the most expert will soon be in trouble, which means a real ender at a faster speed than anyone ever went out hunting, into some feet of soft snow—snow in the eyes, ears, down the back of the neck and anywhere else it can get. These are the falls which are responsible for the sprained knees and ankles and broken legs of the over-confident ones—usually in their second season which is the dangerous stage. Up and on again—perhaps a little more carefully. A speed of some 70 miles an hour has been done on skis (racing of course, not touring), but quite a modest fraction of this seems very very fast. The party, of any number from two upwards, collects periodically to make sure no one is left behind. Presently the tree level is reached and one runs down glades or through scattered trees; the pace becomes slower and falls probably more frequent. Later the wood becomes thicker and the track leads down paths often icy and hard falling and then through what in summer are meadows with timber fences—the latter are not jumped! Eventually the bottom of the valley is reached. Time, twenty minutes to three hours, falls nil to past counting but the century has often been done. Probably another meal, tea or not according to the time of day, but beer and a sort of cross between an omelette and a pancake is very popular. Most of the party then return by train to Wengen or Murren. The more energetic may take the train to Alpiglen then three quarters' to one hour's hard labour to Scheidegg and run down to Wengen. As by now the evening frost has usually touched up the snow, the 2600

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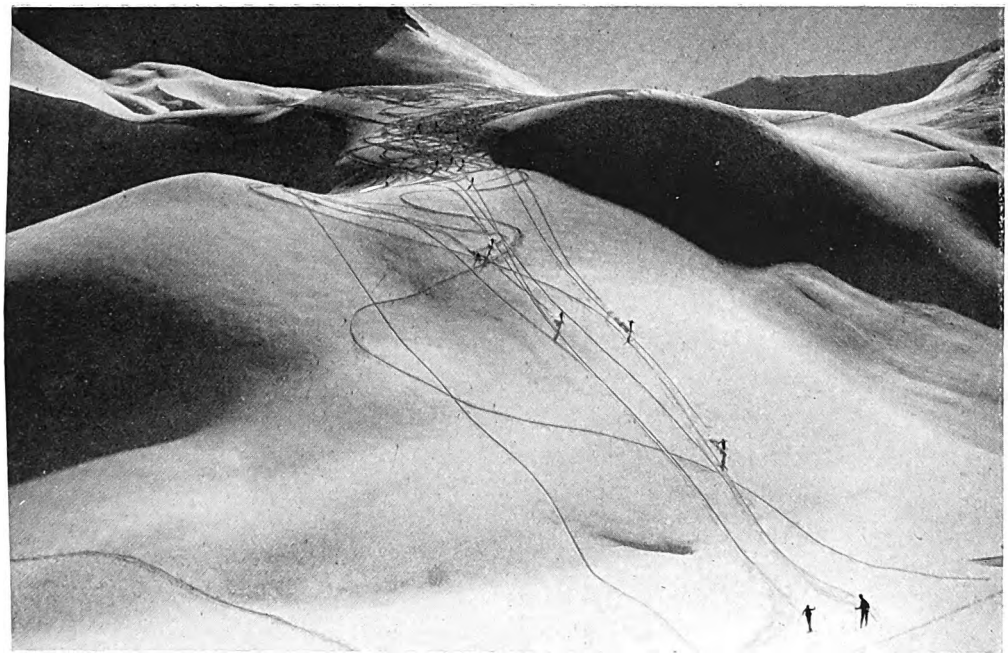

Easy Going.

Typical Country in Eastern Switzerland.

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feet down to Wengen is done, willy nilly, at a speed which gets one as ready for a hot bath as the best day's hunting.

Next one can tour. This means much planning, much staying in small and sometimes uncomfortable hotels, long days, cold winds, disappointments if bad weather sets in, occasionally expense where guides are required, but on the other hand freedom and absence from crowds. Later on these tours can be extended into the high realms of ski mountaineering. Here there is little competition, much hard work and considerable expense, but a sport that may be written with a very big S. I have no experience of winter climbing. But summer climbing is one of the very best sports and no one who gets a chance to try it ever looks back. But it is very hard work too; I have spent 20 continuous hours on a mountain, and all the while working against time. Lastly if one is young and energetic enough one can go in for racing; this is in a way analogous to point-to-points—it is certainly more dangerous—and at the same time brings the quickest development in ski-ing technique. One can go in for jumping though this is only possible up to the age of 25 or so. One of the most charming features of ski-ing is that everyone feels an urge to get better at it, and, broadly speaking, everyone's honest efforts are always repaid.

I have said enough in a general way to show that it would be rash to write much on this subject without help. I am not writing to "recommend" ski-ing as a sport, for in 1930 that would be very out of date; still less am I writing to apologize for it. The number of devotees of this wonderful sport of the snows grows daily and we all wish to benefit from the experience of others. Some of those who have special knowledge of the less known ski-ing countries or who are acquainted with special aspects of this sport are going to place their experiences at our disposal, and if in reading their articles any of the few who have not yet skied are induced to try we are sure they will thank us.

One last word, and without any disrespect. We do not want to form more clubs, to wear a special badge, or produce a distinctive neck-tie. For ski-ing, like hunting, is its own reward.

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PART II.

SKI-ING IN KASHMIR.

By Captain C. I. Curteis, M.C., R.A.

Every year more gunners spend part of their leave in Switzerland, and as a result, each trooping season sees more who have skied coming out to India. Hill shooting is getting expensive and not too easy to obtain, while in north country stations big game shooting is seldom within reach for a short leave. Ski-ing offers a good, energetic holiday for anyone taking their leave before June, or for ten days station leave from anywhere between Lahore, or even Delhi, and Peshawar. The ski-ing season, in Kashmir, lasts from December to the middle of June, the snow line being down to about 6500 feet by the end of January, at 7000 feet in the middle of March, about 9000 feet in early May, and between 11,500 and 12,500 feet by the middle of June, after which it rises very rapidly.

The first recorded use of ski in India is in 1911, when Major Mason, R.E. (Survey of India), collected a book on how to ski and a pair of skis for use in his work. He had never used them before, and though they were a great help on the level and uphill, he found that beginners' falls at 17,000 feet too tiring to compete with. After the war there were a few isolated trips, mostly in the spring, by various ski-runners, but the majority sat in the plains looking at the snow without any idea of enjoying it. The country and the snow being both available, at the end of 1926 it was decided to form a ski club, chiefly to obtain accommodation. The first letter to the papers suggesting this went out in the middle of the hot weather, and most people thought it a bad joke in very poor taste! In March 1927 a bungalow was opened and seven people spent five days at Gulmarg, as an experiment. In December 1927 there were twenty-three club members ski-ing at Gulmarg and the number has steadily increased each year up to about sixty-five for the season 1929-30, of whom a certain proportion were women.

The club is at present concentrating on Gulmarg (8600 feet), which can be reached by motor from Rawalpindi in 14 hours, and the best all-round centre where accommodation already exists. Unfortunately, as the bungalows are built for summer use, when

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cracks do not matter seriously, all are drafty except in March when they are covered with snow. It is hoped that next year the club will have its own house, properly built. Two "Alpine" huts have been presented to the club by two of the original members, these huts are situated above Gulmarg, at about 10,200 feet. The club hope to extend the hut system, eventually, along the Pir Panjal range. Besides arranging accommodation, the club organizes three races, the Lillywhite Cup, an open straight race, the Walser Cup, for less experienced runners, both held at the end of December, and a Services team race in March. A supply of ski and essential gear, including Whymper and five-pound tents is maintained for hire to members.

There are many other areas, outside Kashmir, where ski-ing has been, or could be, obtained:—Razmak, where usually in January and February good running can be had above Spinkamar (on the Sur Narai) about six miles from camp, necessitating a Khassadar escort; Kurram Valley, above Parachinar; Kulu, where the good running is not easy to reach in winter; the Murree Hills, between Rawalpindi and Abbottabad, steep, thickly wooded for the most part, and difficult running.

Afghanistan is now closed, but should a time ever arrive when visitors are encouraged, there is good ski-ing available. The Kagan Valley, near Abbottabad, should be good, but is very inaccessible, while Ziarat, near Quetta, may quite possibly give good running.

Snow conditions in India are very similar to those in Switzerland, in December the average temperature is lower, powder snow packs more quickly and is faster, the depth of snow is greater. There appears to be no fear of a failure of the early snow fall, which usually occurs at the end of November or at latest in the first week of December. In March spring conditions set in, the normal depth of snow being about six feet at Gulmarg and twelve to fifteen feet at 10,000 feet. In March the best running is obtained between 7.30 a.m. and 9.30 a.m. and in the evening just after the sun leaves the snow. The wood running is ideal, trees are big and well spaced so that the possibility of fast continuous running through the trees is the rule and not, as in Switzerland, the exception. Railways are non-existent, but from March to the end of the season, when the snow is hard, the coolie fills the gap to a limited extent.

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The large hotels, dances, American bars, etc., of Switzerland are missing and, unfortunately, so are the village inns; on the other hand there is none of that "Hampstead Heath" bank-holiday effect which is found on some Swiss mountains. The result is that very few come up to ski who are not really keen on sport. The great joy of ski-ing in India is that one is always exploring new country, adding to the ski-route map, and each time a fresh ridge is topped further unmapped country is spread out before your eyes. This year Shin Mahinyu (15,113 feet) was climbed, probably for the first time in winter, and certainly the first time on skis. The party had to spend two nights out in a Whymper tent at 10,800 feet and do a seven hours' climb from the camp. The camp was found so surprisingly warm and comfortable, in spite of its being pitched in twenty feet of snow that it was decided to establish a more luxurious camp for the first ten days in April, to explore another area. Owing to an unexpected curtailment of leave, this had to be postponed until next year, as also was a projected trip on the Kolohoi glacier in April, which would have meant three or four nights in five-pound tents. The two secrets of comfortable camping at this time of year are careful forethought as to what is required and how it is to be delivered to camp, and to turn into bed as soon as the sun goes down, before it gets really cold.

Gulmarg gives excellent ski-ing to the end of March, then you move up to the club huts, one on Khelanmarg and one on Linyan Marg, with a few tents to add to the comfort, and this will ensure ski-ing up to the middle of May. As soon as the areas opened up by the huts are exhausted, anywhere along the Pir Panjal range between Gulmarg and the Banihal Pass camp can always be pitched at the tree line (about 10,800 feet) within easy reach of the plain. This will give ski-ing and some glacier running up to the first week in June. If the camp is kept in one place for ten days or so the cost should work out at about six to eight rupees per day per head. The actual cost at Gulmarg is nine rupees per day, which it is hoped will be reduced if the club house materializes. Those who wish to combine rock climbing with ski-ing will find ample scope for both on the Pir Panjal.

Ski were used for duck shooting on the Wular Lake this year, when the lake was covered with snow ice which would not bear

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a man on foot, and later were found of great use on soft mud, so much so that an experiment will be made this autumn crocodile shooting in the Ganges delta.

Anyone coming out to India, who has skied, would be wise to bring out ski, sticks, and the essential gear (especially boots). Even if posted to the south of India, he is unlikely to spend more than a small proportion of his tour of duty in the south, and it must not be forgotten that all "sports" gear sent out to India, unless taken in as part of one's personal kit, has to pay a 30 per cent. customs duty.

PART III.

A COURSE WITH THE CZECHOSLOVAKIAN ARMY.

By Lieut.-Colonel A. J. Farfan, D.S.O., O.B.E., R.A.

Last year the Government of Czechoslovakia invited our War Office to send five British officers to attend a six-weeks Ski Course which was being held in the High Tatras for their Frontier and Mountain Brigades. Accordingly five of us, two gunners, a sapper and two infantrymen, presented ourselves at Hrebionek where the Course was to be held. The journey there in itself was interesting. We went first to Prague, the ancient capital of Bohemia and now the capital of the Czechoslovakian Republic, and from there for about three hundred miles through Bohemia and Slovakia to Poprad, which lies at the foot of the High Tatras. From Poprad we went by an electric railway to Smokovec, better known in the days of the Austro-Hungarian Empire as Schmecks, and from there by a rope railway to our mountain home in Hrebionek. The cold throughout the journey was intense. The thermometer registered 40 degrees below zero—Centigrade or Fahrenheit—which you will, for, curiously enough, 40 degrees below zero Centigrade is also 40 degrees below zero Fahrenheit. The trains, although warm inside, were quite frozen outside and resembled great blocks of ice moving across the plains. The country, of course, was deep in snow, and even the fast-flowing Danube frozen over.

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Our reception at Hrebionek was most cordial. We found there the Commandant, Major Dusil, one of the finest type of Czech officers, a man of very charming personality and kindly disposition, and, as we soon found out, a born mountaineer with a knowledge of ski-ing and snowcraft second to none. With him were four instructors, all very good skiers and mountaineers, and about 25 Czech officers who formed the course. We were soon on the most friendly terms with the Czechs and, indeed, throughout the course nothing could have exceeded their kindness and courtesy to us. One of the instructors spoke English very well but generally our medium of conversation was German. The Czechs themselves talk their own Czech language which is akin to Russian but most of them can talk German, though, so great is the anti-German feeling in Czechoslovakia, that many pretended that they could not. Not a single officer on the course could talk French, which was rather surprising considering that their army is based and trained on French methods. The whole course was billeted in the Sports Hotel which, as a matter of fact, is the only building in Hrebionek and is nothing more nor less than a large double-storied mountain hut. The rooms however were good and well warmed, and the food, though very simple, was well cooked and ample. Though lacking the luxurious comfort of the Swiss palaces, the Sports Hotel possessed the great advantage that the inclusive rate per diem was only 7s. 6d. as opposed to about four times that amount in Switzerland.

The High Tatras lie at the western end of the Carpathians and here form the frontier between Czechoslovakia and Poland. To anyone accustomed to the long open slopes of Switzerland they are, at first appearance, very disappointing from a ski-ing aspect. The lower slopes are heavily wooded and above the tree line the mountains rise very rugged and steep, and with bare rocks showing through in many places. On closer acquaintance, however, one finds delightful runs through the woods along well-cut paths, and above the tree line are open valleys like those in Switzerland. True, there are many rocks, bushes, watercourses, etc., which have to be jumped or avoided by sharp turns. But what of this? If you are the sort that likes hunting over Irish bank country with the Duhallow, or rough Border country with the Duke of Buccleuch's,

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Two British officers talking to the G.O.C. Frontier District.

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or stiff Leicestershire country, then you will like ski-ing in the Tatras. But if you are one who prefers riding over open Sussex downs, or hacking in the Park, then you and such as you will be well advised to avoid the Tatras as the devil avoids holy water. For, there you will find no well-flagged tourist runs as in Switzerland. There you will find no funicular railways to take you to the mountain top from whence, in company with two or three hundred other tourists, you can get your run down with the minimum of effort (and maximum of expense). In the Tatras you must work for your sport. You will have to do many hours of hard climbing, guiding yourself by the map (the maps in Czechoslovakia are excellent) or by the light of nature. You will occasionally meet another party of skiers or maybe a customs patrol but, on the whole, you will be alone in the solitude and grandeur of the mountains, and therein lies the fascination and charm of the Tatras.

The work on the course was strenuous and extremely thorough. The instruction was excellent. For the first three weeks we normally paraded at 8 a.m. and were kept hard at it till noon, and again from 2 p.m. to 4 p.m. The course catered for the beginner, although a little previous knowledge of ski-ing was a decided advantage especially later on when it came to touring. We therefore began at the very beginning, the first day learning all the elementary points of ski-ing such as the correct position and distribution of weight in straight running, kick turns, how to fall, various methods of climbing slopes, etc. We then went on to Christianias and later to jump turns. The Czech army pins its faith on the Stem Christiania, maintaining that if this turn is thoroughly mastered any form of snow except breakable crust can be negotiated, and for this latter condition they add the jump turn. We did actually receive a little instruction in Telemarks but it was impressed on us that this was only to be regarded as an agreeable form of ski-ing when the slope was gentle and the snow good, and was not to be considered as really serious ski-ing. Their real objection to the Telemark is that it is so fundamentally opposed to the Stem Christiania that its practice leads to bad habits in the execution of the latter. The Czech army, also, having to do a lot of ski-mountaineering, perforce use much shorter skis than those in general use in Switzerland, and with short skis the Tele-

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mark, besides being by no means easy, is apt to be dangerous on account of the tendency to cross one ski behind the other. It must be remembered, too, that military ski-ing differs considerably from ordinary pleasure ski-ing. The soldier skier is heavily laden. Besides his ordinary "marching order"—rifle, ammunition, great-coat, blanket, rations, waterbottle, etc.—he has to carry part of the mountaineering outfit, either an ice-axe or a 30-metre length of rope. He is part of a platoon and if a man in front of him falls he must be able to turn or stop at a moment's notice. Therefore, perfect control at all times rather than high speed is aimed at, and for this the Stem Christiania as a general service turn fills their bill.

Quite a feature of this first part of the course was the P.T. on skis that we did each day. Both at rest and on the move we did all forms of "balance and extension motions" and it certainly was a great help both in getting the muscles used to unaccustomed strains and in maintaining balance when running down. We also learned the jumping of all sorts of obstacles, and the groundwork of ski-mountaineering, the use of ropes, ice-axes, and crampons. On days when the weather was too bad to go out in we had lectures on such subjects as the care and fitting of ski equipment, snowcraft, snow camping, etc. We were also taught the uses and application of the various kinds of wax. In the Czech army climbing skins are never used so we became experts in waxing our skis for varying conditions of snow and slope.

The latter three weeks of the course were spent principally in touring. The tours either took the form of route marches over the mountains with a view to putting into practice what we had learnt on the home slopes, or as part of a tactical scheme. They were usually along the frontier and the schemes generally dealt with the attack or defence of the various passes into Poland. On the days that we went on tours parade was at 6 a.m., and in the dark and bitter cold of the morning we would file off and climb steadily for two or three hours through the woods. Then we would get above the tree line and into the open snow fields beyond, and by this time the sun would be well up. It reminded one very much of a morning in January with the Peshawar Vale—the same bitter cold and early start in the morning and then the glorious warm

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sunshine making life feel really worth living. About 9 a.m. a halt for a snack of food and to take off superfluous clothing. After the halt we would continue our climb in shirt sleeves and after perhaps another two or three hours, partly on skis, partly on foot, sometimes having to use ropes and ice-axes, would reach the peak or the pass which was our goal. Here we would have lunch, and after lunch the wonderful run down back to Hrebionek by some different route. Sometimes we went further afield and had to spend the night in one of the mountain huts of which there are several dotted about the Tatras.

In the last week of the Course we did an extremely interesting three days' tour. There is a dangerous pass over the High Tatras—called the Iron Gate—which had never before been crossed in winter. Our Commandant, however, was anxious to prove that a small body of troops if well led could cross the mountains at this point. The first day we went by train to Strebske Pleso, which in summer is the principal watering place of the Tatras, and from there in the afternoon had a climb of about two hours to a mountain hut hotel lying on the shores of the Popradske Pleso (Pleso is the Czech for lake) at the foot of the mountain leading to the Iron Gate. The only untoward incident of this part of the tour was that the Commandant, leading the course, at the last sharp turn down to the hut overshot the mark, and closely followed by the second file, both crashed into a tree. The Commandant broke two ribs, but such was the man that he said nothing about it and, although in great pain, carried on for the next two days as if nothing had happened.

The next day at 5 a.m. we started to climb up towards the pass. The first three hours was fairly easy going up to the plateau of the Frozen Lake, so called because the lake lying all day in shadow remains frozen throughout the summer. Soon after leaving the Frozen Lake however, the slopes became very wind-swept and hard and it was extremely difficult to get a foothold with skis. The Commandant therefore ordered skis to be taken off and slung and we proceeded on foot. It was very hard going as the crust was just breakable and we went in at each step up to our thighs in snow. We then came to ice and had to put on crampons (climbing irons) and after another hour's climbing found ourselves at the

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bottom of a couloir leading to the Iron Gate and about 500 metres below it. Here we had to use ropes, the leading man (an instructor) cutting steps with his ice-axe as he went. It was a very slow proceeding; it was bitterly cold, the couloir was in shadow, and a howling gale with flying snow blowing through it. We eventually at 2 p.m. reached the top of the pass, a narrow razor-edged saddle. There was a wonderful view on to the plains below but we were too numbed with cold to appreciate it.

We now started the descent. The last part of the ascent had been bad enough but the slope on the further side was far steeper. It consisted of ice covered with about a foot of loose snow giving practically no foothold. The skilled mountaineer negotiates such a slope by keeping the body upright and leaning right over so that he is as nearly as possible at right angles to the slope, but to the novice this hanging over space is a terrifying ordeal. The natural tendency when you feel your feet slipping is to lean back and sit down, which is fatal. True, we had a rope to hang on to, but our hands were so numbed that they had no power in them. Occasionally somebody would drop a ski stick and the sickening way in which it rushed down with ever increasing speed was very disturbing. After about two hours of very slow descent we came to a valley across which we were able to traverse for half a mile on skis. We then came to a slope which our commandant with his practised eye saw was liable to avalanche. He therefore halted us and ordered us to cross it singly at 20 metres distance. As if to prove his knowledge of snowcraft, a curious phenomenon now occurred. The whole slope broke up into large slabs of crusted snow and the mountain side in front of us started to move slowly downwards. It gave one a very peculiar and giddy sensation rather like being in a train which is standing still at a station when another train alongside moves off. We felt as if we were slowly moving up the mountain. The slope, however, did not avalanche to the full and after waiting a bit we crossed it very gingerly without mishap. This brought us to a ledge over which in summer there is a big waterfall. It was now pure ice and there seemed to be no way down. It was also getting late with less than three hours of daylight left and still a long way to go. The Commandant assisted by the instructors then did a reconnaissance to try and find a way down

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and it was really marvellous to watch them traversing slopes on which we could not have stood even with the help of a rope. After an hour's search a practicable way was found, and tied on to the end of a rope we were let down, one by one, down a wall of ice. The manner in which the last man, an instructor, managed to get down was nothing short of wonderful. The rest of the way was comparatively easy, and after a mile or so on foot we had a very good run down on skis to the foot of the mountain. Here we were met by three sleighs and for the last three miles were towed along by "ski-jöring," arriving dead tired at the village of Javorino at 8 p.m.

The following day we started at 6 a.m. on our return journey, but this time by an easier pass (the Kopa Pass), and though a very arduous twelve hours' trek it was good ski-ing and quite devoid of any mountaineering difficulties.

In conclusion, it may be stated that to anybody keen on learning to ski this course with the Czechoslovakian army is of the very best value. Though the work at times is hard, it has its lighter moments. In Hrebionek itself there was not much in the way of amusement, but about two miles below us lay the fairish sized town of Smokovec. Before the war Smokovec was part of Hungary and it still forms the principal winter sports centre of the Hungarians. It has a very good ice rink and an excellent Grand Hotel. From our hotel it was an easy and delightful run down on skis or by bob sleigh, and both on the rink and at the dances at the Grand Hotel the Hungarian and Czech ladies were very charming and friendly to the English officers. And on Sundays and occasional off days we had many enjoyable ski excursions to various parts of the Tatras in pleasant company.

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NOTES ON STEEPLECHASING FOR A BEGINNER.

(ANON.)

THE intention of this article is to help anyone who may be thinking of trying his luck at the regimental meeting at Sandown next year or who may be contemplating taking up racing this winter.

The first consideration is the type of horse required and there are two main alternatives: either you buy a racehorse ready made or you possess a hunter that you think might be good enough for foxhunter races. The average officer usually goes in for a "general utility" horse: as a rule he cannot afford to keep a "specialist" horse, by which is meant a horse kept solely for racing, show jumping, or for the show ring. However, if he is keen and can afford a racehorse, all the better. The great advantage of course of the ready-made article is that, provided you have invested in a safe performer, you have only yourself to educate on the racecourse and not your horse as well. You must remember of course, when buying a horse, that if he has won a race other than a foxhunter race, e.g. a handicap or a selling race, he is debarred from taking part in the great majority of races confined to foxhunters (i.e. horses with hunters' certificates), including the Liverpool foxhunters and the Cheltenham foxhunters. The class of horse running in handicaps is a very great deal better than the foxhunter class, and whereas in the latter case you will be riding against amateurs, in the former you will usually be riding against professionals who, despite any allowances you may draw, will be immeasurably better than yourself. If, however, you intend racing throughout most of the winter you must give up the idea of competing in foxhunter races owing to their late start. The first one in 1930 took place on February 15th. While on this subject, there are always two foxhunter races at the Grand Military meeting, one on the first day for maidens, and the Tally-ho steeplechase on the second day, and next year at the R.A. meeting two of the three R.A. races including the R.A. Gold Cup will be for foxhunters though, in the case of the Gold Cup, horses who have won races other than foxhunter races will be eligible.

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Walton Handicap Steeplechase. Taking the first fence.

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The more usual horse is the hunter. An officer having probably ridden his hunter in point-to-point races thinks he can gallop rather faster than the average and decides to exploit him in a foxhunter race or two, probably making a start at the Grand Military or R.A. meeting. Incidentally it is worth remembering the excellent money given for second and third places at both meetings, especially at the R.A. meeting.

A decision you have to make is whether to send the horse to a trainer or not. Provided that you choose the right man who will give your horse good individual attention and that you give him reasonable time your horse will be got really fit for you and he will be well schooled. If you intend to run him at the Grand Military meeting in the middle of March you should send him to the trainer by the middle of January at the latest. The horse then should be well in himself, hunting fit and, if possible, rather on the big side in condition: there is no reason why you should not hunt him hard up to Christmas. The great drawback of having a horse in training is the expense, and for that very reason the writer strongly advises the officer of average means to shun training stables even though he may have great difficulty in finding facilities for training the horse himself. A usual charge by a trainer is four guineas a week, one pound a month gallop fee towards repair of fences and keeping the gallop in good order, and shoeing will probably be about another pound monthly. It is usual, too, to have an agreement with your trainer that he takes ten per cent. of the stake actually paid to you if you win. This is a good idea as the system of giving a present is not always satisfactory, especially if other owners in the stable are very much richer than yourself. They will give big presents on winning and you will be expected to do the same. You are also billed, on winning, about £4 which is shared by the head lad and the lad that looks after your horse. The bills quickly mount up: the only way to get your money back is to win races, and these are not won so easily. You may think that you have a good horse and possibly he may be, but to win races luck, not only for your horse but also for yourself, is required, and fortune does not always smile even on beginners. Therefore, on account of the heavy costs or unless money is only a secondary consideration or you have absolutely no facilities for training your

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horse yourself, training stables should be avoided. Besides you will gradually learn a great deal if you train your own horse, but on starting go to someone for advice and read any articles that you can find and which appear sound on training the racehorse or the point-to-point horse.

It may be of interest to give some idea as to the cost of running a horse at a meeting, say about 80 miles away. The expenses mount up as follows. It is supposed that the horse goes to the meeting the day before running and returns the day after. Stabling and forage are practically always free. Valets travel round all the regular meetings; they can supply you with anything and everything; they have every weight of saddle and can help you in a multitude of ways. If you use one of their saddles it is usual to pay about £1: otherwise you pay about ten shillings. The usual entry money for the average race is £2 or £3. This must be paid before your horse can run:—Expenses are therefore as follows:—

	£	s	d
Horse box and lad's expenses	8	10	0
Valet	1	0	0
Entry fee	2	0	0
Total ...	£11	10	0

In addition come your own travelling expenses. At the R.A. meeting there are practically no expenses for the owner whose horse runs. The entry money is returned and your horse box paid for.

There seems to be very little written on the subject of the equitation of steeplechasing. The writer is only a beginner and consequently ventures the following remarks with no little diffidence. The remarks are the result of a little experience (some of it bitter), of a certain amount of observation of the better-known riders and of what he has heard said by experts. The intention is only to deal with one or two main points.

The first point to be considered is the length of stirrup. The great thing is to be comfortable but you must ride a great deal shorter than you do out hunting. There are three main reasons for this:—*(a) The pace.* Put a snaffle bridle on your hunter when he is really fresh and send him along fast, first of all with your stirrups at the usual hunting length and then a second time with

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your stirrups up six or seven holes. You will find that in the second case you are very much more comfortable and that you can now sit still, whereas before you were being thrown about and bumped in the saddle. *(b) The hold.* You will find that after your horse has done a gallop or two he will begin to take a real good hold and that you have to sit up against him and take a firm hold of his head. To do this successfully you must ride short: unless you do so you will be unable to hold a keen horse. *(c) Security.* Riding short gives maximum security due to the thigh leverage but you lose to a large extent the use of the lower leg. This is counterbalanced by the fact that your horse has learnt to take a strong hold and gallop into his fences: consequently there is not the same necessity for using the lower leg to the same extent as there is for ordinary riding purposes.

For these three reasons you should pull up your stirrups, and the best way to accustom yourself to the new position is to do so gradually till you reach a point where you are comfortable, yet not so short as to prevent you from using your legs quite well in time with your horse when you want to drive him into his fence. Perhaps the average amateur, not greatly practised, will pull up his stirrups from six to nine holes.

As to holding the reins. You can ride with a rein in each hand with or without either a single or a double bridge of reins. You have a single bridge when with the left hand, besides holding the left rein, you hold that part of the right rein which lies slack behind the right hand at a point about eight inches behind the right hand. Thus the right rein is prolonged from the right hand to the left and makes a bridge, the hands being held apart at the normal distance. A double bridge of reins, as its name implies, is formed by two single bridges: hold the rein as just described but in this case, with the right hand, you also hold the slack of the left rein and so you have the two reins running together from one hand to the other forming a double bridge. This last is probably the usual method. Its advantages are that it gives you the best assistance in holding a pulling horse, that you may be saved from falling off if you happen to bring down a hand on each side of the horse's neck, and lastly that having slipped your reins you can easily and quickly pick them up again as follows: with the right hand still

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in the slipped position run the left hand down the left rein at the same time pressing it over towards the right rein. Put the thumb of the left hand, still grasping the left rein, over the right rein and hold both reins in the palm of the left hand and put your right hand back in the normal position. Some people find it hard at first to slip when using a bridge of reins but, if you are able to do so, it is an advantage.

Fences may be merely incidents to the expert but for the beginner they are much more. To win races you must "stay on top". This sounds obvious but it is not always quite so easy as it looks from the grand stand. The main essential, therefore, of your seat over fences is that it should give a modicum of security qualified to a certain extent by the adjustment of your seat to enable your horse to jump confidently and quickly. When galloping fast balance seems more important than grip: if you once lose your balance events happen so fast that grip has no time to step in and restore the lost balance. Bearing these considerations in mind let us consider how we may ride over a plain steeplechase fence, firstly if your horse comes "right" and secondly if he comes "wrong". In the first case approach your fence with the body approximately upright and with the seat bones just clear of the saddle—you cannot drive a horse if you are sitting crouched forward—and if on a free going horse, use your legs very quietly and in "time" with him for two or three strides before the jump so that, if anything, he will gain rather than lose ground when he jumps.

As he takes off the rider may swing his body very slightly forward, as he tops the fence the body should be about perpendicular and should be kept in this position, by leaning slightly back, throughout the rest of the jump and with the legs rather forward. The knee should never be completely straightened out. In this case it should be as in the photograph showing F. B. Rees. The bent knee even though but slightly bent takes up some of the shock of impact on landing. In this case it may not be necessary to slip your reins: if you do it will only be a short slip. You must keep contact with your horse's mouth the whole time. If, at the last moment before taking off, you lose contact it not only unbalances the horse but he quickly begins to lose confidence in you and will not jump well and quickly for you. During the approach you may

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Putney Handicap Steeplechase. Taking the second fence.

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have to use your legs in varying degrees depending on the circumstances, but at the same time you must sit still and keep the hands still.

If the horse comes "wrong" it may mean a big stand back or getting too close. If you realize in time that you are coming "wrong", drive him at the fence thereby extending his stride and hoping for a reasonable stand back. The method of sitting on, or attempting to, is the same either for a stand back or if too close. Keep a firm hold of his head at all costs and as he takes off sit back and cock your legs well forward, at the same time slipping your reins to such a length that you will not catch him in the mouth. On landing safely quickly gather up your reins and at once bring your weight forward to the normal galloping position and thank your lucky stars that you are still "there". These remarks apply equally to your approach to and seat over the open ditch. The only difference is that if you come "wrong" and your horse is going on freely it is probably preferable to sit quite still for the last two or three strides as opposed to driving him. Otherwise you may cause him to stand back too far from the guard-rail.

Riding a finish, especially on a tired horse, is an art in itself. The more obvious points to try and bear in mind seem to be as follows: that you must keep your horse balanced by keeping a feeling on his mouth; that you cannot ride a finish with your seat in the air; your seat must be lowered to put you in a position to "drive" your horse; the rider's legs must be used "in time" with the horse so as to increase his stride: and the rider's body must be kept as still as possible. To use the whip in a finish is very difficult and probably the beginner is best advised not to do so but only to use legs and hands. Many a race has been lost by the misuse of the whip, the rider being unable to keep his horse balanced and straight with one hand at the same time using the whip "in time" with the horse with the other.

A few points on the actual riding of the race are as follows:—Go the shortest way round: this may sound obvious but it is very easy to swing out at a corner, lose two or three lengths and probably allow someone to come up on the inside. Do not follow the horse immediately in front of you into his fence but keep a little behind and slightly to one side or the other: then, if your leader falls,

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you do not necessarily follow his example. Do not jump your fences half a length behind the horse alongside you as it may make your horse take off at the same time as the other one; the result of this may be a huge standback and a very probable fall. Do not lie too far out of your ground. Only a great deal of practice teaches you to judge pace and, as a rule, it is best to let your horse gallop along with the main body. If you appear to have a chance of winning try to be level or in front at the last fence. If you are only out to give your horse a school let him gallop along with the others and when he tires pull him up.

Some people are put off making a start at the Grand Military or R.A. meeting by the thought of Sandown Park. A great deal is talked about the stiffness of the course and its difficulties. As regards the first: the fences are the ordinary regulation size, and it was stated by those who ought to know and who rode there last March and April that the fences were anything but stiff. As to its difficulties: there are three fences close together shortly after the start of the three miles, but it is quite noticeable that it is the tear-away racehorse who is more apt to come to grief there rather than the reasonably balanced hunter. An amateur who has once ridden at Sandown would, I think, just as soon ride there as anywhere. As to the large crowd—well, surely it makes little difference if you fall off in front of 5000 people or 10,000 people. It will be found that the hunter should, given some schooling, jump the course quite well. There are, too, many horses who are indifferent jumpers in the hunting field yet who jump well when racing. The writer knows of one personally: he was a horse who never learnt to arch his back properly and consequently was, though bold, but an indifferent jumper out hunting unless he could go fast. The faster he went the better he jumped and he jumped regulation fences well and quickly.

In conclusion the writer once more wishes to state that he is no expert and is very little more than a beginner himself: that this article has only been written in the hope that something in it may be useful to the many officers who, it is hoped, will make a beginning next year and support the regimental meeting. There may be many difficulties of all sorts to overcome before it is possible to have that first ride in a steeplechase, but anyone having overcome them will surely never regret it.

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ROYAL REGIMENT OF ARTILLERY.

Succession List of Colonels Commandant.

COMPILED BY CAPTAIN J. SANDILANDS, LIBRARIAN, R.A. INSTITUTION.

NOTE.—"Be" = BENGAL. "Bo" = BOMBAY. "M" = MADRAS.

No. in "Kane's List", etc.	Names.		Army and Hon. Rank.	Regtl. Rank.	Date of Death.
1	Borgard, Albert	*lg.*	2-7-1739	1-4-1722	8-2-1751
34	Belford, William	*g.*	29- 8-77	8- 3-51	1- 7-80
35	Michelsen, Borgard	*mg.*	25- 6-59	4- 2-57	26- 2-62
31	Williamson, George	*lg.*	25- 2-72	20-11-59	11-11-81
51	Desaguliers, Thomas, F.R.S.	*lg.*	29- 8-77	10- 3-62	1- 3-80
54	Ord, Thomas	*c.*	1- 1-71	1- 1-71	18- 4-77
55	Pattison, James	*g.*	26- 1-97	25- 4-77	1- 3-05
66	Godwin, John	*mg.*	19-10-81	18- 3-80	23- 1-86
73	James, Thomas	*c.*	19- 2-79	6- 7-80	6- 3-82
83	Cleaveland, Samuel	*lg.*	28- 9-87	3-12-81	29- 8-94
87	Brome, Joseph (Master-Gunner, St. James's Park) ...	*lg.*	12-10-93	11- 3-82	24- 4-96
128	Straton, John	*g.*	29- 4-02	1-10-83	16- 5-03
109	Martin, William	*lg.*	1- 1-98	13- 2-86	12- 7-99
129	Macbean, Forbes, F.R.S.	*lg.*	1- 1-98	25- 9-93	11-11-00
161	Stehelin, Benjamin	*mg.*	12-10-93	30- 8-94	24- 9-96
162	Drummond, Duncan	*lg.*	26- 6-99	6- 3-95	27- 6-05
214	Farrington, Sir Anthony, Bt.	*g.*	1- 1-12	25- 4-96	3-11-23
222	Walker, Ellis	*g.*	1- 1-12	25- 9-96	14- 3-20
228	Davies, Thomas	*lg.*	25- 9-03	13- 7-99	16- 3-12
231	Martin, Philip	*g.*	4- 6-14	2-10-99	5- 8-21
232	Borthwick, William	*lg.*	1- 1-05	12-11-00	27- 6-08
241	Lloyd, Vaughan	*g.*	4- 6-14	14-10-01	16- 6-17
247	Stewart, John	*mg.*	1- 1-01	17- 5-03	12- 1-07

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No. in "Kane's List", etc.	Names.		Army and Hon. Rank.	Regtl. Rank.	Date of Death.
260	Congreve, Sir William, Bt.	*lg.*	25- 4-08	12- 9-03	30- 4-14
277	Huddlestone, William Orcher	*lg.*	25- 7-10	2- 3-05	13- 2-14
282	Fead, George	*lg.*	25- 7-10	28- 6-05	20-11-15
334	Blomefield, Sir Thomas, Bt.	*g.*	19- 7-21	1- 6-06	24- 8-22
337	Manley, Orlando	*mg.*	25- 4-08	13- 1-07	15-12-08
369	Lawson, Robert	*lg.*	4- 6-13	1- 2-08	25- 2-16
395	Fage, Edward	*mg.*	25- 4-08	28- 6-08	2- 9-09
408	Stephens, Edward	*lg.*	4- 6-13	16-12-08	30- 6-15
424	Douglas, Robert	*lg.*	4- 6-14	4- 9-09	4- 4-27
449	Ramsey, John	*lg.*	4- 6-14	17- 3-12	9- 2-27
455	Trotter, Thomas	*mg.*	25- 7-10	14- 2-14	6- 3-19
456	Macleod, Sir John, G.C.H. (Master-Gunner, St. James's Park)	*lg.*	4- 6-14	1- 5-14	26- 1-33
458	Smith, Sir John, G.C.H.	*g.*	10- 1-37	3- 7-15	2- 7-37
459	Cuppage, William	*lg.*	12- 8-19	21-11-15	9-11-32
463	Seward, Thomas	*lg.*	12- 8-19	26- 2-16	7- 1-31
466	Laye, Francis	*lg.*	12- 8-19	17- 6-17	20- 1-28
467	Willington, Bailey	*lg.*	12- 8-19	15- 3-20	16-10-23
484	Howorth, Sir Edward, K.C.B., G.C.H.	*lg.*	12- 8-19	6- 8-21	5- 3-27
534	Stehelin, Edward	*lg.*	19- 7-21	17-10-23	22-10-27
653	Bloomfield, *Lord* Benjamin, G.C.B., G.C.H.	*lg.*	22- 7-30	4-11-23	15- 8-46
578	Smith, Sir John Frederick Sigismund, K.C.H.	*mg.*	12- 8-19	10- 2-27	11- 4-34
588	Shrapnel, Henry	*lg.*	10- 1-37	6- 3-27	13- 3-42
593	Wulff, George	*lg.*	10- 1-37	5- 4-27	16- 8-46
594	Dixon, George William	*mg.*	12- 8-19	23-10-27	27- 4-36
596	Wilson, Sir Wiltshire, K.C.H.	*lg.*	10- 1-37	21- 1-28	8- 5-42
615	Young, Brooke	*mg.*	12- 8-19	8- 1-31	19- 5-35
633	Ramsey, George	*mg.*	19- 7-21	10- 2-32	6- 9-34
641	Parry, Spencer Claudius	*lg.*	10- 1-37	27- 1-33	13- 6-45
651	Millar, William	*lg.*	10- 1-37	12- 4-34	14- 3-38

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No. in "Kane's List", etc.	Names.		Army and Hon. Rank.	Regtl. Rank.	Date of Death.
655	Salmon George	*lg.*	10- 1-37	7- 9-34	1- 6-48
659	Maclean, Sir Joseph, K.C.H.	*lg.*	28- 6-38	20- 5-35	19- 9-39
665	Dickinson, Richard	*lg.*	28- 6-38	28- 4-36	5-12-46
679	Pritchard, Edward	*lg.*	23-11-41	3- 7-37	5- 2-45
705	Beevor, Robert	*lg.*	23-11-41	15- 3-38	27- 9-43
727	Carncross, Sir Joseph Hugh, K.C.B.	*lg.*	9-11-46	20- 9-39	7-12-47
730	Watson, Alexander	*lg.*	9-11-46	14- 3-42	11- 8-49
739	Worsley, Edward Vaughan	*lg.*	9-11-46	9- 5-42	14- 8-50
742	Downman, Sir Thomas, K.C.B., K.C.H.	*lg.*	9-11-46	28- 9-43	10- 8-52
747	Evelegh, Henry	*g.*	20- 6-54	6- 2-45	24- 9-59
756	Fyers, Peter, C.B.	*mg.*	10- 1-37	14- 6-45	17- 5-46
766	Gardner, Hon. William Henry	*g.*	20- 6-54	1- 4-46	15-12-56
772	Walker, Frederick Nathaniel	*g.*	12- 6-54	18- 5-46	3- 2-57
790	Tobin, Joseph Webbe	*g.*	20- 6-54	16- 8-46	21- 2-63
826	Brough, Richard Secker	*g.*	16-12-56	17- 8-46	15- 1-59
829	Power, James	*mg.*	23-11-41	6-12-46	17- 2-51
869	Forbes, Thomas John	*g.*	16- 1-59	8-12-47	1- 2-68
877	Smith, James Webber, C.B.	*lg.*	11-11-51	2- 6-48	21- 3-53
886	Munro, Sir Alexander, K.H.	*mg.*	9-11-46	1-11-48	16-10-49
890	Ross, Sir Hew Dalrymple, G.C.B. (Master-Gunner, St. James's Park)	*fm.*	1- 1-68	1-11-48	10-12-68
904	Birch, Robert Henry	*mg.*	9-11-46	12- 8-49	29- 6-51
905	Armstrong, James	*mg.*	9-11-46	17-10-49	20- 6-53
930	Paterson, Thomas	*lg.*	20- 6-54	15- 8-50	13- 6-56
944	Oliver, Nathaniel Wilmot	*mg.*	9-11-46	18- 2-51	11- 1-54
951	Lacy, Richard John James	*mg.*	9-11-46	30- 6-51	9- 3-52
972	Campbell, Frederick	*g.*	25- 9-59	10- 3-52	4- 4-66
974	Turner, Sir George, K.C.B.	*g.*	24- 1-63	11- 8-52	9-12-64
979	Gardiner, Sir Robert William, G.C.B., K.C.H. (Master-Gunner, St. James's Park)	*g.*	28-11-54	22- 3-53	26- 6-64

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983	Wallace, Peter Margetson	*g.*	22- 2-63	21- 6-53	14-12-64
984	Jones, Richard	*lg.*	28-11-54	12- 1-54	18- 5-63
988	Jones, John Edward	*mg.*	20- 6-54	17- 2-54	29- 8-54
996	Hutchesson, Thomas	*lg.*	14- 6-56	30- 8-54	28- 8-57
1002	Whinyates, Sir Edward Charles, K.C.B., K.H.	*g.*	10-12-64	1- 4-55	25-12-65
1004	Michell, Sir John, K.C.B.	*g.*	27- 6-64	14- 6-56	23- 8-66
1074	Power, Sir William Greenshields, K.C.B., K.H.	*g.*	4- 2-57	16-12-56	23- 1-63
1114	Dyneley, Thomas, C.B.	*lg.*	16-12-56	4- 2-57	21- 6-60
1057	Cobbe, George	*g.*	15-12-64	29- 8-57	8- 2-65
1064	Mercer, Alexander Cavalié	*g.*	9- 2-65	16- 1-59	9-11-68
1144	Colebrooke, Sir William Macbean George, C.B., K.H. ...	*g.*	21-12-65	25- 9-59	6- 2-70
1134	Cator, Sir William, K.C.B.	*g.*	5- 4-66	1- 4-60	11- 5-66
1104	Scott, Henry Alexander	*g.*	12- 5-66	22- 6-60	1- 8-68
1161	Wylde, William, C.B. (Master-Gunner, St. James's Park)...	*g.*	24- 8-66	24- 1-63	14- 4-77
1143	Gordon, Henry William	*lg.*	19- 5-63	22- 2-63	19- 9-65
1169	Maclachlan, Alexander	*lg.*	22- 6-60	19- 5-63	26- 2-66
1258	Brereton, Sir William, K.C.B., K.H.	*lg.*	27- 6-64	1- 4-64	27- 7-64
1239	Chesney, Francis Rawdon, F.R.S.	*g.*	1- 1-68	27- 6-64	30- 1-72
1668	*rha* Dacres, Sir Richard James, G.C.B.	*fm.*	27- 3-86	28- 7-64	6-12-86
1726	Williams, Sir William Fenwick, Bt., G.C.B.	*g.*	2- 8-68	10-12-64	26- 7-83
1714	Dupuis, Sir John Edward, K.C.B.	*g.*	10-11-68	15-12-64	25-11-76
1180	Sabine, Sir Edward, K.C.B., F.R.S.	*g.*	7- 2-70	9- 2-65	26- 6-83
1354	Higgins, Thomas Gordon	*lg.*	26-12-65	20- 9-65	20- 6-71
1242	Bell, Sir William, K.C.B.	*g.*	31- 1-72	26-12-65	28- 3-73
1261	England, Poole Vallancey (Master-Gunner, St. James's Park)	*g.*	29- 3-73	27- 2-66	6-11-84
1516	Bloomfield, Sir John, G.C.B. (Master-Gunner, St. James's Park)	*g.*	26-11-76	5- 4-66	1- 8-80
1461	Warde, Sir Francis, K.C.B.	*g.*	15- 4-77	12- 5-66	4- 5-79
1464	Ingilby, Sir William Bates, K.C.B.	*g.*	1-10-77	24- 8-66	6- 8-79

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1561	Cuppage, Sir Burke, K.C.B.	*lg.*	2- 2-68	2- 2-68	19- 4-77
1563	Burn, Robert	*g.*	1-10-77	2- 8-68	19-12-78
1595	Thorndike, Daniel	*lg.*	10-11-68	10-11-68	16-11-75
1655	Flude, Thomas Peters	*g.*	1-10-77	11-12-68	13- 7-85
495Be	Grant, Charles, C.B. (late Bengal)	*g.*	1-10-77	11-12-68	13- 1-82
389M	Croggan, John William (late Madras)	*lg.*	10- 4-76	14-12-68	2- 5-77
396M	Whistler, Thomas Kensington (late Madras)	*g.*	1-10-77	29- 8-69	5-10-85
1688	Teesdale, Henry George	*lg.*	21- 6-71	7- 2-70	12- 9-71
1711	Shuttleworth, Ashton Ashton	*lg.*	13- 9-71	21- 6-71	7- 6-76
1744	Copland-Crawford, Robert FitzGerald	*g.*	1-10-77	13- 9-71	9- 3-95
504Be	Alexander, Sir James, K.C.B. (late Bengal)	*g.*	1- 8-72	21- 1-72	6- 6-88
1746	St. George, Sir John, G.C.B. (Master-Gunner, St. James's Park)	*g.*	1-10-77	31- 1-72	17- 3-91
399M	Moore, Richard Cornwallis, C.B. (late Madras)	*g.*	1-10-77	6-10-72	16-12-79
522Be	Lane, John Theopilus, C.B. (late Bengal)	*g.*	6-10-72	7-10-72	1- 6-95
1751	*rha* Warde, Sir Edward Charles, K.C.B.	*g.*	1-10-77	29- 3-73	11- 6-84
537Be	Fordyce, Sir John, K.C.B. (late Bengal)	*lg.*	21- 1-72	5- 4-73	26- 2-77
540Be	Campbell, George, C.B. (late Bengal)	*g.*	21- 7-74	10- 5-74	25- 4-82
267Bo	Trevelyan, Henry Willoughby, C.B. (late Bombay) ...	*mg.*	25- 3-67	21- 7-74	31- 8-76
1874	Dickson, Sir Collingwood, VC., G.C.B. (Master-Gunner, St. James's Park)	*g.*	1-10-77	17-11-75	28-11-04
1767	*rha* Wood, Sir David Edward, G.C.B.	*g.*	1-10-77	8- 6-76	16-10-94
331Bo	Sealy, George Prince (late Bombay)	*g.*	8-12-79	1- 9-76	11-11-92
1775	*rha* Fitzmayer, Sir James William, K.C.B.	*g.*	1-10-77	26-11-76	27- 5-95
548Be	Abbott, Sir James, K.C.B. (late Bengal)	*g.*	1-10-77	27- 2-77	6-10-96
1760	Askwith, William Harrison	*g.*	27- 6-79	15- 4-77	25-11-97
1765	Dalton, Charles James	*lg.*	1-10-77	20- 4-77	7-11-80
401M	Simpson, George William Young (late Madras)	*g.*	1-10-77	4- 5-77	27- 1-79
588Be	Brind, Sir James, G.C.B. (late Bengal)	*g.*	1-10-77	3-10-77	3- 8-88
338Bo	Kemball, Sir Arnold Burrowes, K.C.B., K.C.S.I. (late Bombay)	*g.*	28- 2-80	30- 6-78	21- 9-08

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1781	Francklyn, John Henry, C.B.	*g.*	13-11-80	20-12-78	12- 2-81
409M	Maitland, John (late Madras)	*lg.*	1-10-77	28- 1-79	16- 3-81
1808	Rowan, Henry Sebastian, C.B.	*lg.*	1-10-77	5- 5-79	26- 5-80
1814	Marriott, Thomas Beckett Feilding	*lg.*	1-10-77	7- 8-79	25-11-80
421M	Balfour, Sir George, K.C.B. (late Madras)	*g.*	1-10-77	17-12-79	12- 3-94
1817	Wright, Charles James	*g.*	13- 2-81	27- 5-80	3-11-81
1844	Smythe, William James, F.R.S.	*g.*	1- 7-81	2- 8-80	12- 7-87
1911	*rha* D'Aguilar, Sir Charles Lawrence, G.C.B.	*g.*	1- 4-84	8-11-80	2-11-12
1848	Phillpotts, Arthur Thomas	*g.*	23- 5-82	26-11-80	2- 9-90
1854	Lefroy, Sir John Henry, K.C.M.G., C.B., LL.D., F.R.S. ...	*g.*	10- 5-82	13- 2-81	11- 4-90
473M	Selby, George (late Madras)	*lg.*	8-12-79	17- 3-81	18- 6-84
1891	Adye, Sir John Miller, G.C.B.	*g.*	20-11-84	4-11-81	26- 8-00
639Be	Turner, Sir Frank, K.C.B. (late Bengal)	*g.*	1-10-77	14- 1-82	19-12-90
640Be	Carleton, Henry Alexander, C.B. (late Bengal)	*g.*	10- 7-79	26- 4-82	22- 2-00
660Be	Thuillier, Sir Henry Edward Landor, KT., C.S.I. (late Bengal)	*g.*	1- 7-81	1- 1-83	6- 5-06
1858	Price, Edward, C.B.	*g.*	1- 7-81	27- 6-83	13- 8-87
1892	Campbell, Sir Frederick Alexander, K.C.B.	*g.*	5- 7-86	27- 7-83	15- 9-93
1932	Turner, John, C.B.	*g.*	1- 4-86	12- 6-84	9- 4-86
484M	Macintyre, Andrew William, C.B. (late Madras)	*lg.*	1- 9-81	19- 6-84	26- 2-85
1902	Gardiner, Sir Henry Lynedoch, K.C.V.O., C.B.	*g.*	1-10-82	7-11-84	15-12-97
507M	Gosling, William Clarke Francis (late Madras)	*g.*	31-12-83	27- 2-85	14- 6-85
531M	Cadell, Sir Robert, K.C.B. (late Madras)	*g.*	31- 3-83	15- 6-85	30- 6-97
2010	Biddulph, Sir Michael Anthony Shrapnel, G.C.B.	*g.*	1-11-86	14- 7-85	23- 7-04
542M	Campbell, Napier George (late Madras)	*g.*	31-12-91	6-10-85	21-10-12
346Bo	Aitken, William David (late Bombay)	*g.*	31- 3-83	27-11-85	18-11-97
1905	Radcliffe, Robert Parker	*lg.*	1- 9-83	10- 4-86	29- 3-07
1996	Hamley, Sir Edward Bruce, K.C.B., K.C.M.G.	*g.*	30- 7-90	7-12-86	12- 8-93
554M	*rha* Pearse, George Godfrey, C.B. (late Madras)	*g.*	25- 5-95	23- 1-87	5-12-05

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673Be	de Tessier, *Baron* Henry Price (late Bengal)	*g.*	31- 3-83	7- 6-88	27- 5-95
2057	Gage, Hon. Edward Thomas, C.B.	*lg.*	1-11-82	13- 7-87	22- 5-89
1988	Henry, Charles Stuart	*lg.*	1-10 82	14- 8-87	5-10 92
687Be	Olpherts, Sir William, VC., G.C.B. (late Bengal)	*g.*	31- 3-83	4- 8-88	30- 4-02
1999	*rha* Fraser, Hon. Sir David MacDowall, K.C.B.	*g.*	1- 7-85	22- 5-89	25- 2-06
2131	Yates, Henry Peel, C.B.	*g.*	1- 5-85	12- 4-90	14- 3-96
1973	Williams, Edward Arthur, C.B.	*lg.*	1- 5-85	3- 9-90	20- 6-98
736Be	Johnson, Sir Edwin Beaumont, G.C.B., C.I.E. (late Bengal)	*g.*	1-10-77	20-12-90	18- 6-93
1979	Johnson, George Vanderheyden	*lg.*	10-12-83	18- 3-91	11- 7-03
1992	Pipon, Philip Gosset, C.B.	*g.*	1- 4-86	6-10-92	3-11-05
347Bo	Fuller Charles Boudler (late Bombay)	*g.*	31- 3-83	12-11-92	25- 8-04
818Be	Cordner, James Edward (late Bengal)	*g.*	25- 5-95	19- 6-93	3- 9-01
2020	Arbuthnot, Sir Charles George, G.C.B.	*g.*	31- 7-90	13- 8-93	14- 4-99
2023	Hastings, Francis William, C.B.	*g.*	1-10-87	16- 9-93	24- 8-14
571M	Playfair, Elliot Minto (late Madras)	*g.*	25- 5-95	13- 3-94	29- 5-99
2024	Smyth, Sir Henry Augustus, K.C.M.G.	*g.*	19- 5-91	17-10-94	18- 9-06
2365	Biddulph, Sir Robert, G.C.B., G.C.M.G. (Master-Gunner, St. James's Park)	*g.*	25-11-92	6- 3-95	18-11-18
857Be	*rha* Stirling-Hamilton, Sir William, Bt., C.B., (late Bengal)	*g.*	25- 5-95	28- 5-95	26- 9-13
2060	Leslie, George	*lg.*	22- 4-87	28- 5-95	22- 2-97
868Be	Nicholl, Thomas (late Bengal)	*g.*	25- 5-95	1- 6-95	13- 1-03
2072	Tupper, Gaspard Le Marchant, C.B.	*lg.*	25-10-87	15- 3-96	2- 7-06
895Be	Roberts, Rt. Hon. F. S., *Earl*, VC., K.G., K.P., G.C.B., O.M., G.C.S.I., G.C.I.E., V.D. (late Bengal) (Master-Gunner, St. James's Park)	*fm.*	25- 5-95	7-10-96	14-11-14
2089	Fraser, George Henry John Alexander	*lg.*	1- 4-88	23- 2-97	15-11-99
595M	Kerrich, Walter D'Oyley (late Madras)	*g.*	25- 5-95	1- 7-97	27- 1-11
402Bo	Bayly, Abingdon Augustus (late Bombay)	*g.*	25- 5-95	19-11-97	11- 8-00
2550	Brackenbury, Rt. Hon. Sir Henry, G.C.B., K.C.S.I. ...	*g.*	26- 9-01	26-11-97	20- 4-14
2114	Hay, Sir Robert John, K.C.B.	*lg.*	1- 4-89	16-12-97	25-11-10
2136	Williams, Sir William John, K.C.B.	*lg.*	1-11-90	21- 6-98	22- 4-03

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2152	Campbell, Patrick John	*mg.*	5- 7-86	15- 4-99	23-12-04
608M	McGrigor, Duncan John (late Madras)	*g.*	25- 5-95	30- 5-99	7- 7-09
2366	Stirling, Sir William, K.C.B.	*g.*	5- 1-02	16-11-99	11- 4-06
938Be	Griffin, Edward Christian (late Bengal)	*lg.*	25- 5-95	23- 2-00	16- 5-17
435Bo	Le Cocq, Hubert (late Bombay)	*g.*	25- 5-95	12- 8-00	15- 2-11
2246	Oldfield, Richard	*mg.*	25-10-87	27- 8-00	16-10-12
962Be	Walker, Alexander, C.S.I. (late Bengal)	*mg.*	1-12-94	17-10-00	21- 2-05
977Be	Elliott, Edward Draper (late Bengal)	*mg.*	1- 4-95	4- 9-01	30- 9-18
979Be	*rha* Ward, Francis William, C.B. (late Bengal) (Master-Gunner, St. James's Park)	*mg.*	25- 5-95	1- 5-02	27- 3-19
1031Be	*rha* Chapman, Sir Edward Francis, K.C.B. (late Bengal) (Master-Gunner, St. James's Park)	*g.*	15- 3-96	14- 1-03	12- 5-26
2249	*rha* Williams, Sir Albert Henry Wilmot, K.C.V.O.	*mg.*	1- 4-88	23- 4-03	29-10-19
2247	Purvis, Herbert Mark Garrett	*mg.*	12- 9-88	12- 7-03	8-10-12
2515	Foster, Bowes Lennox	*lg.*	28- 4-95	24- 7-04	7-10-19
2292	Markham, Sir Edwin, K.C.B.	*lg.*	27- 3-95	25- 8-04	31- 3-18
2375	Nicolls, Oliver Henry Atkins	*mg.*	27- 8-90	29-11-04	15-10-20
2438	Geary, Sir Henry Le Guay, K.C.B.	*lg.*	25-10-98	24-12-04	31- 7-18
1068Be	Saward, Michael Henry (late Bengal)	*mg.*	23- 6-96	22- 2-05	13- 2-28
2329	Alderson, Sir Henry James, K.C.B.	*mg.*	9- 7-92	4-11-05	10- 9-09
613M	Mc Mahon, Charles Joseph (late Madras)	*g.*	25- 5-95	6-12-05	3- 4-06
2631	Owen, Sir John Fletcher, K.C.B.	*g.*	7-12-04	26- 2-06	10- 6-24
616M	Mc Leod, Harry (late Madras)	*g.*	25- 5-95	4- 4-06	17- 6-09
2611	Harness, Arthur, C.B.	*mg.*	11- 4-94	12- 4-06	13-10-27
2473	Nicholson, Stuart James, C.B.	*mg.*	27- 3-95	7- 5-06	10- 4-17
2891	Maurice, Sir John Frederick, K.C.B.	*mg.*	8-12-95	3- 7-06	11- 1-12
2453	Richardson, John Booth	*mg.*	22- 5-96	19- 9-06	31-10-23
2521	Lewes, Henry Colebrooke	*mg.*	24- 7-96	30- 3-07	1- 8-07
3712	Rundle, Sir H. M. Leslie, G.C.B., G.C.M.G., G.C.V.O., D.S.O.	*g.*	10- 9-09	2- 8-07	
3085	Pretyman, Sir George Tindal, K.C.M.G., C.B.	*mg.*	11- 6-97	22- 9-08	3- 8-17
2810	Stewart, Sir Robert MacGregor, G.C.B.	*g.*	11- 4-08	18- 6-09	22-10-19

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2638	Lloyd, Francis Thomas, C.B.	*mg.*	1-10-97	8- 7-09	18-11-12
2622	Hutchinson, William Francis Moore	*mg.*	5- 1-98	11- 9-09	22- 4-17
2770	*rha* Holley, Edmund Hunt	*mg.*	2- 7-98	26-11-10	9- 4-19
2825	Turner, Sir Alfred Edward, K.C.B.	*mg.*	25-10-98	28- 1-11	20-11-18
3083	Hunter, Woodburn	*mg.*	20-11-98	16- 2-11	17- 3-21
3436	*rha* Wodehouse, Sir Josceline Heneage, G.C.B., C.M.G. (Resigned (ill-health) 14-5-23)	*g.*	19- 6-11	12- 1-12	16- 1-30
2873	Slade, Sir John Ramsay, K.C.B.	*mg.*	26- 4-99	9-10-12	4- 9-13
2716	Tyler, Trevor Bruce, C.S.I.	*mg.*	1- 5-00	17-10-12	12- 2-23
3179	Elles, Sir Edmond Roche, G.C.I.E., K.C.B.	*lg.*	12- 2-07	22-10-12	
2775	French, Sir George Arthur, K.C.M.G.	*mg.*	25- 5-00	3-11-12	7- 7-21
3546	Creagh, Arthur Gethin, C.B.	*mg.*	2-12-00	19-11-12	
2997	Wace, Richard, C.B.	*mg.*	31- 1-02	5- 9-13	25- 5-20
2866	O'Callaghan, Sir Desmond D. T., K.C.V.O.	*mg.*	1- 4-02	27- 9-13	
3240	Scott, Sir Charles Henry, K.C.B.	*mg.*	1- 4-02	21- 4-14	6-10-19
3209	Knox, Sir William George, K.C.B.	*mg.*	9- 9-02	25- 8-14	14-12-16
3262	Montgomery, Robert Arthur, C.B., C.V.O.	*mg.*	4-11-02	14-12-16	
3340	Parsons, Sir Lawrence Worthington, K.C.B.	*lg.*	8- 5-09	23- 4-17	20- 8-23
3994	Wingate, Sir F. Reginald, Bt., G.C.B., G.C.V.O., G.B.E., K.C.M.G., D.S.O., D.C.L., LL.D., D.L.	*g.*	5-11-13	17- 5-17	
3451	Murray, Sir James Wolfe, K.C.B.	*lg.*	1- 4-09	9- 4-17	17-10-19
3217	Hay, Edward Owen, C.B	*mg.*	12- 9-03	4- 8-17	
3602	Sclater, Sir Henry Crichton, G.C.B., G.B.E.	*g.*	3- 6-19	1- 4-18	26- 9-23
3951	*rha* Horne, *The Lord*, G.C.B., K.C.M.G., D.C.L., LL.D. (Master-Gunner, St. James's Park)	*g.*	1- 1-19	1- 8-18	14- 8-29
3326	Eustace, Sir Francis John William, K.C.B.	*mg.*	5- 3-04	1-10-18	7-12-25
3679	Anderson, Sir Charles A., K.C.B., K.C.I.E., A.M.	*lg.*	12- 5-14	19-11-18	
4384	Milne, Sir George F., G.C.B., G.C.M.G., D.S.O., D.C.L., LL.D. (Master-Gunner, St. James's Park)	*fm.*	30- 1-28	21-11-18	
3928	Hamilton-Gordon, Sir Alexander, K.C.B.	*lg.*	1- 1-19	28- 3-19	
4272	DuCane, Sir John P., G.C.B.	*g.*	19- 2-26	10- 4-19	

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3968	Holland, Sir Arthur E. A., K.C.B., K.C.M.G., D.S.O., M.V.O.	*lg.*	1- 1-19	7-10-19	7-12-27
4283	Furse, Sir William T., K.C.B., D.S.O.	*lg.*	1- 1-19	8-10-19	
4354	*rha* Birch, Sir F. J. Noel, G.B.E., K.C.B., K.C.M.G	*g.*	1-10-26	18-10-19	
3272	Leach, Sir John, K.C.V.O.	*mg.*	18- 4-04	23-10-19	22- 1-27
3202	Barron, Sir Harry, K.C.M.G., C.V.O.	*mg.*	20- 9-04	30-10-19	27- 3-21
3273	Dalton, James Cecil	*mg.*	14- 4-05	26- 5-20	
3613	*rha* Bannatine-Allason, Sir Richard, K.C.B., C.M.G. ...	*mg.*	1- 1-09	2-12-21	
3263	Nixon, Arundel James	*mg.*	31- 5-06	2-12-21	9- 4-25
3516	Brunker, Sir James M. S., K.C.M.G.	*mg.*	22- 6-10	2-12-21	
3334	Trotter, Sir James K., K.C.B., C.M.G.	*mg.*	24- 7-06	2-12-21	
4123	Jeudwine, Sir Hugh S., K.C.B., K.B.E.	*lg.*	3- 1-23	13- 2-23	
3471	Jeffreys, Henry Byron, C.B., C.M.G.	*mg.*	26-12-07	15- 5-23	
3811	*rha* Fanshawe, Sir Edward A., K.C.B.	*lg.*	3- 6-19	21- 8-23	
3396	Bowles, Frederick Augustus, C.B.	*mg.*	7- 4-08	27- 9-23	
3612	Lindsay, Sir Walter F. L., K.C.B., D.S.O.	*mg.*	7- 2-12	1-11-23	7- 3-30
3488	Baldock, Thomas Stanford, C.B.	*mg.*	1- 1-10	11- 6-24	
3927	von Donop, Sir Stanley B., K.C.B., K.C.M.G.	*mg.*	26-10-14	10- 4-25	
3754	Mercer, Sir H. Frederic, K.C.M.G., C.B. (Retired on account of age 31-12-28)	*mg.*	18- 2-15	13- 5-26	
3697	Adye, Sir John, K.C.M.G., C.B. (Retired on account of age 18-11-27)	*mg.*	19- 6-11	1- 7-26	
4408	Uniacke, Sir Herbert C. C., K.C.B., K.C.M.G.	*lg.*	11- 9-25	23- 1-27	
4670	MacMunn, Sir George F., K.C.B., K.C.S.I., D.S.O.	*lg.*	26- 8-25	14-10-27	
4991	Montgomery-Massingberd, Sir Archibald A., K.C.B., K.C.M.G.	*lg.*	16- 3-26	19-11-27	
3839	Kemball, Sir George V., K.C.M.G., C.B., D.S.O. (Retired on account of age 22-10-29)	*mg.*	8- 4-14	8-12-27	
4225	Headlam, Sir John E. W., K.B.E., C.B., D.S.O.	*mg.*	18- 2-15	14- 2-28	
4547	Thwaites, Sir William, K.C.B., K.C.M.G.	*lg.*	1-10-26	1- 1-29	
4252	Smith, Sir H. Guthrie, K.C.B.	*mg.*	1- 4-15	15- 8-29	10- 8-30
4025	Montgomery, Sir Robert A. K., K.C.M.G., C.B., D.S.O. ...	*mg.*	3- 6-15	22-10-29	
4759	Gillman, Sir Webb, K.C.B., K.C.M.G., D.S.O.	*lg.*	1-11-26	8- 3-30	

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BENGAL, MADRAS AND BOMBAY ARTILLERY.

Succession List of Colonels Commandant prior to amalgamation with the Royal Artillery.

No. in "Kane's List", etc.	Names.		Army and Hon. Rank.	Regtl. Rank.	Date of Death.
	Bengal Artillery.				
290	Ahmuty, James	*g.*	15- 9-55	29- 8-24	12- 1-64
318	Swiney, George	*g.*	15- 5-59	1-12-34	10-12-68
323	Pollock, Sir George, G.C.B., G.C.S.I.	*fm.*	24- 5-70	3- 3-35	6-10-72
325	Lindsay, Sir Alexander, K.C.B.	*g.*	11- 9-59	2- 7-35	20- 1-72
347	Powney, Richard	*lg.*	21- 9-59	12- 7-44	23- 1-65
357	Gowan, George Edward, C.B.	*lg.*	27- 9-59	3- 7-45	21- 1-65
389	*rha* Brooke, Sir George, K.C.B.	*g.*	24- 5-70	21- 7-51	31-12-82
426	Huthwaite, Sir Edward, K.C.B.	*lg.*	6- 3-68	23- 1-54	4- 4-73
441	Twemlow, George	*lg.*	24- 5-70	6- 3-54	2-10-77
483	*rha* Wilson, Sir Archdale, Bart., G.C.B.	*lg.*	6- 3-68	14-10-58	9- 5-74
489	Abbott, Augustus, C.B.	*mg.*	13- 4-60	14-11-58	25- 2-67
	Madras Artillery.				
244	Showers, Edward Melian Gullifer	*g.*	4- 3-58	2- 1-33	13-12-68
264	Cullen, William	*lg.*	11-11-51	1-10-42	1-10-62
281	Ketchen, James	*lg.*	13-10-57	26- 3-44	8- 8-62
309	Montgomerie, Sir Patrick, K.C.B.	*g.*	1- 3-67	7-10-49	5-10-72
310	Conran, George	*lg.*	24- 1-65	15- 5-51	28- 8-69
329	*rha* Whinyates, Francis Frankland	*g.*	21- 1-72	12- 8-53	22- 1-87
	Bombay Artillery.				
206	Griffith, Julius George	*lg.*	7- 9-66	3- 7-45	31- 7-72
216	*rha* Schuler, Frederick	*g.*	11-12-68	28- 4-51	20- 7-74
258	Rowland, Andrew	*g.*	1-10-77	4- 7-58	29- 6-78
261	Coghlan, Sir William Marcus, K.C.B.	*g.*	1-10-77	8- 5-59	26-11-85

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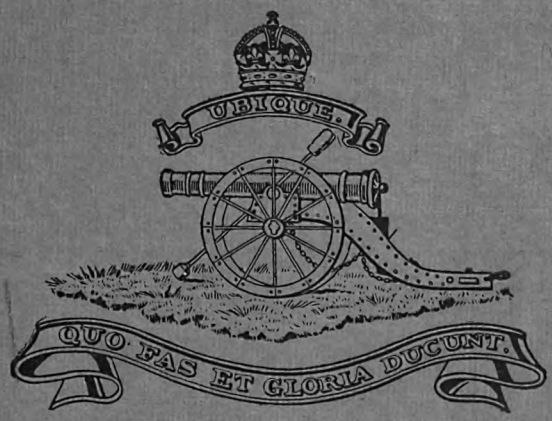

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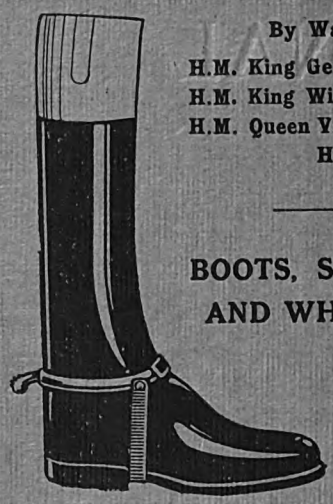

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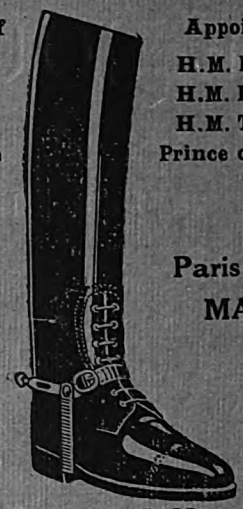

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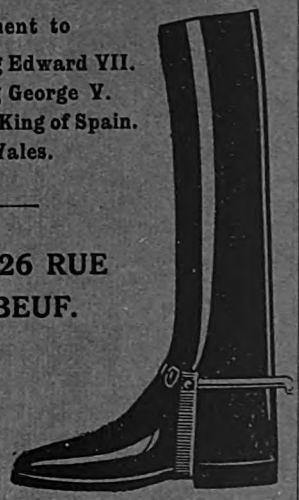

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SIDELIGHTS ON GREAT SOLDIERS.

By Captain (Bt. Major) J. N. Kennedy, M.C., R.A., *p.s.c.*

The most active or busy man that hath been or can be hath, no question, many vacant times of leisure.

BACON.

"THERE are many benefits which the enthusiastic sportsman may expect to derive from hunting. I speak of the health which will thereby accrue to the physical frame, the quickening of the eye and ear, the defiance of old age, and last, but not least, the warlike training which it ensures. To begin with, when some day he has to tramp along rough ways under arms, the heavy infantry soldier will not faint or flag—he will stand the toil from being long accustomed to the same experiences in capturing wild beasts. In the next place, men so trained will be capable of sleeping on hard couches, and prove brave guardians of the posts assigned them. In the actual encounter with the enemy, they will know at once how to attack and to carry out the word of command as it passes along the lines, because it was just so in the old hunting days that they captured wild game. If posted in the van of battle they will not desert their ranks, because endurance is engrained in them. In the rout of the enemy their footsteps will not falter nor fail: straight as an arrow they will follow the flying foe, on every kind of ground, through long habituation. Or if their own army encounter a reverse on wooded or precipitous ground beset with difficulties, these will be the men to save themselves with honour and to extricate their friends; since long acquaintance with the business of the chase has widened their intelligence . . . . Among the many pleasures to which youth is prone, this one alone is productive of the greatest blessings . . . . It tends to make them sound of soul and upright . . . . *Of such stuff are good soldiers and good generals made.*"

So, more than two thousand years ago, wrote Xenophon, the celebrated historian and illustrious commander of the Ten Thou-

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sand.[1] Notwithstanding that "broad classification works havoc with truth," few will dispute that Xenophon's precepts on this subject are still generally applicable to the training of soldiers. Warfare is not yet such a mechanical business (and perhaps it never will be) that a commander would not wish his army to be one of hardened sportsmen. That the training of the chase has still the value attributed to it by Xenophon in the fashioning of the commander himself, is not so sure. Yet it is generally true, as Von der Goltz observes, that "the officer must preserve his youthful vigour to a comparatively high age . . . . Nature demands her due . . . . and in a sick body the mind cannot possibly remain fresh and clear." Of this we may be sure at least—that the old prescription "mens sana in corpore sano" is still a touchstone in the make up of a commander.

The great commanders of early times seem, almost without exception, to have excelled, in their youth at least, in athletic pastimes. Under the conditions of early warfare, it would have been hard indeed for them otherwise to have fulfilled the leader's role. One of the earliest stories of Alexander the Great, handed down by Plutarch, indicates his courage and skilful horsemanship while still a boy.

"When Philonicus, the Thessalian, offered the horse, named Bucephalus, in sale to Philip, at the price of thirteen talents (i.e. £2,518 15s. sterling), the king, with the prince and many others, went into the field to see some trial made of him. The horse appeared extremely vicious and unmanageable, and was so far from suffering himself to be mounted, that he would not bear to be spoken to, but turned fiercely upon all the grooms. Philip was displeased at their bringing him so wild and ungovernable a horse, and bade them take him away. But Alexander, who had observed him well, said, 'What a horse they are losing for want of skill and spirit to manage him!' 'Young man,' remarked Philip, 'you find fault with your elders, as if you knew more than they, or could manage the horse better'. 'And I certainly could', answered the prince. 'If you should not be able to ride him, what forfeiture will you submit to for your rashness?' 'I will pay the price of the horse.' Upon this all the company laughed; but the king and

[1] Cynegeticus or Guide to Hunting.

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prince agreeing to the forfeiture, Alexander ran to the horse, and laying hold of the bridle, turned him to the sun; for he had observed, it seems, that the shadow which fell before the horse, and continually moved as he moved, greatly disturbed him. While his fierceness and fury lasted he kept speaking to him softly and stroking him; after which he gently let fall his mantle, leaped lightly upon his back, and got his seat very safe. Then, without pulling the reins too hard, or using either whip or spur, he set him a-going. As soon as he perceived his uneasiness abated, and that he wanted only to have his head, he put him in a full gallop, and pushed him on with both voice and spur. Philip and all his court were in great distress for him at first, and a profound silence fell. But when the prince had turned him and brought him straight back, they all received him with loud acclamations, except his father, who wept for joy."

During his campaigns Alexander's leisure was spent in hunting or in reading and writing. His hunting appears to have included the pursuit of lions with hounds, and we are told that he hazarded his person both by way of exercise for himself and example to others. "If he was upon a march which did not require haste," says Plutarch, "he would exercise himself in shooting and darting the javelin, or in mounting and alighting from a chariot at full speed. Sometimes also he diverted himself with fowling and fox hunting." Before he was corrupted by Persian luxury, he was also very temperate in eating and he scorned the pleasures of the table, saying "his cooks were a march before day to dress his dinner, and a light dinner to prepare his supper." It is on record that he rebuked his officers for luxury, saying, "It was very strange to him that they did not remember that those who come from labour and exercise always sleep more sweetly than the inactive and effeminate."

Hannibal, whom Wellington described as "by many degrees the greatest soldier on record," was vigorous, athletic and hardy and excelled in all manly sports. He was noted for his horsemanship, and "his chief pride lay in the beauty of his arms and his steeds." His habits were simple—he drank little wine and often ate but once a day. Hannibal was remarkable for the purity of his life and the nobility of his character, even in the estimation of

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his enemies who, indeed, are alone responsible for the records by which we know him.

Julius Cæsar, when he attained years of maturity at least, was remarkable for the austerity of his private life and the simplicity of his habits. Cæsar's youth, it is of interest to note, Napoleon described as "une jeunesse oisive et des plus vicieuses." Being subject to fits, "he endeavoured to strengthen his constitution by long marches, by simple diet, by seldom coming under covert . . . . When he slept, it was commonly upon a march, either in a chariot or a litter." Cæsar does not appear to have been a great hunter or sportsman, but he was an excellent swimmer and a good horseman. In his early years "he brought his horsemanship to such perfection by practice that he could sit a horse at full speed with his hands behind him." He dictated letters to his secretaries as he rode on horseback.

Nearly all great soldiers have been good horsemen (although Napoleon was not), and, that this should have been so, is not surprising when one considers the thousands of miles they travelled on horseback upon their lawful occasions. Oliver Cromwell was no exception to the rule, and he took more than a sportsman's pleasure in fine horses. He "was fond of hawking, hunting, coursing, and liked a game of bowls." When he first began to stand out in the public imagination in 1645, "he was the idol of his troops; he prayed and preached among them; he played uncouth practical jokes with them; he was not above a snowball match against them; he was a brisk, energetic, skilful soldier, and he was an invincible commander." The fact that we in the British Army neglect the study of Cromwell's campaigns, is strange indeed. Says Lord Morley, "In speed and vigour, in dash and in prudence, in force of shock and quick steadiness of recovery; in sieges, marches, long wasting campaigns, pitched engagements; as commander of horse, as tactician, and as strategist, the modern expert ranks Cromwell among the foremost masters of the rough art of war in every branch. Above all, he created the instrument which in discipline, skill, and those highest military virtues that come of moral virtues, has never been surpassed." Says Carlyle, "Napoleon does by no means seem to me so great a man as Cromwell." Cromwell's genius illumines every page of the record of the battles

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in which he fought, both as a subordinate and later as commander-in-chief. In battle after battle we have the spectacle of Cromwell as the ideal cavalry commander, at a time when cavalry was the decisive arm, marking the critical point, concentrating upon it with splendid initiative, and snatching victory from the jaws of defeat. His was indeed a heroic figure. What an achievement was his. Devoid of personal ambition, "he had a life of sore strife and toil, to his last day." In Carlyle's words, "It is a stern business killing of a king. . . . Once at war, you have made wager of battle with him; and it is he to die or else you."

In many ways the character of the next great English soldier, Marlborough, offers a profound contrast to that of the Protector. Contemporary and later judgment of this brilliant general was happily expressed by Bolingbroke when he said, "He is so great a man that I forget his faults." Of his private life we are told that "he was a lover of animals, he did not gamble, he did not drink." He was "an expert swordsman, a graceful equestrian, a crack tennis player, an excellent dancer."

Of the two great Swedish soldiers, Charles the Twelfth and Gustavus Adolphus, it is recorded that, while the latter was proficient in all manly exercises, Charles, who "left a name at which the world grew pale," found no attraction in pleasure. But he was hardened to fatigue and cold, and always shared the coarsest fare of the soldiers with an easy cheerfulness which won him their passionate devotion. The eccentric Suvoroff, who was never defeated, resembled Charles in this latter respect, and always lived like a common soldier, even sleeping by preference on a truss of hay. Only five feet four inches in height, he was strong and healthy and inured to hardship.

Frederick the Great, in his youth, "hated the hunt but loved the dance." His is a curious case. His father brought him up with extreme rigour in the hope that he would become a hardy soldier and "acquire thrift and frugality." The result was just the opposite. He refused to ride or shoot, and generally indulged in frivolous and effeminate amusements. It was only in later life, as Ludwig points out in his masterly sketch, that his character attained harmony. His first victory was at Mollwitz in 1741. Under the impression, produced by a charge of the Austrian cavalry, that the

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battle was lost, he rode away and was not seen again for sixteen hours. Had he been of humbler rank, a firing squad might well have rendered history the poorer, and benefited mankind in proportion. In later years, however, he gave ample proof of personal courage. His habits were sociable. In the evening there was usually a concert in his palace. At eight-thirty he sat down to supper, which often went on until midnight. He was then surrounded by intimate friends, mostly Frenchmen, and insisted on the conversation being perfectly free. In his judgments of mankind he often talked as a misanthrope. When some one once remarked that the inborn inclination of men was rather to good than evil, he replied, "Ah, you don't know this damned race." This is reminiscent of Napoleon's saying "It is by fear and interest only that men are moved." He was more fortunate than Napoleon in the art of making friends, which Bonaparte lost and tried vainly to recover in his exile. He resembled Napoleon closely in one trait—his vast ambition.

Until his later years, Napoleon lived a simple and active life, and his physical matched his mental powers. Bourrienne notes "that he could endure great fatigue, not only on horseback and on foot when with the army, but at all times; frequently walking five or six hours at a time without being aware of it." "Bonaparte has often said to me," he continues, "Bourrienne, you see how temperate and thin I am; but nothing can prevent me from thinking that, by the time I am forty, I shall become a great eater, and get very fat . . . . I take a deal of exercise; but what of that—it is a presentiment, and it will certainly be realized." "For the bath he had an absolute passion . . . . I have known him to remain there for two hours. During this time I read to him . . . . While he remained in the bath, he used to be continually turning on the warm water and, at times, would raise the temperature so that I have found myself enveloped in such a dense vapour that I could not see to read, and had to open the door." "He drank very little wine; it was always claret or burgundy, but he preferred the latter . . . . He took snuff very sparingly."

Napoleon was never interested in sport or games. Even "at chess he was eminently unskilful and it taxed the courtliness of his suite (in St. Helena) to avoid defeating him," as Lord Roseberry

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tells us. Berthier once invited him to a "chasse au lapin," and stocked his park with some thousand rabbits to ensure good sport. Unfortunately the rabbits were so tame that they swarmed round the Emperor thinking he was going to feed them, and the entertainment was a fiasco. At the Tuileries his only exercise seems to have been an evening walk in the gardens or a shopping expedition, incognito, with Bourrienne as a companion. At St. Helena his habits of life were most regular and simple. In fact Bourrienne is probably not far from the truth when he says "few men were ever less influenced by the appetites which are peculiar to man than Napoleon." Perhaps those historians are right who consider that Napoleon was burnt out physically as well as mentally by the time he reached middle age. "After Moscow," says Lord Roseberry, "there had been a great transformation, his force of character was diminished, he was easily fatigued . . . . During the Hundred Days his genius and physical powers were alike in profound decline."

Neither was the Duke of Wellington an accomplished sportsman, but he certainly indulged in outdoor recreation to a greater extent than Napoleon. Lord Ellesmere says, "The Duke rode good and safe horses, and I have seen him take good fences when needful." It is well known that a pack of hounds was maintained with the army in the Peninsula and that the Duke hunted with it. He was fond of partridge shooting and Ellesmere writes that "he used to shoot at everything, no matter what the range, and was especially pleased when he brought off a long shot, when he would praise the maker of his guns." In his later years an umbrella invariably accompanied him while shooting, and his fellow sportsmen, who were not quite so original, were glad enough to share it when the rain came down. On one occasion when the Duke visited George IV at a shooting lodge, they went out shooting partridges. Their marksmanship was bad, one at least of them missing every shot; the subject of the morning's occupation was not once mentioned at dinner.

The Duke's habits were simple throughout his life, and that this contributed to the maintenance of his iron constitution there can be no doubt. In his diet he was very temperate and very careless. In India he ate little but rice, drank little or no wine,

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and enjoyed uniform good health. On his later campaigns, when he was consulted as to the menu, his invariable instruction was "cold meat." It is recorded of him that, in the flow of conversation at dinner, he would help himself to everything that came round, until his plate was heaped with the most incongruous articles, and then would send it away practically untouched. He always slept on a camp bed whether in the field or at home.

Although the accuracy of the saying that "the Battle of Waterloo was won on the playing fields of Eton" would hardly bear close examination by any but an Etonian, it must be conceded that it has more than one grain of truth in it. Not the least is that the Duke himself was an Etonian, and, as we have it in his own words, "By God, I don't believe they'd have done it, had I not been there."

The Duke's greatest contemporary is by many considered to have been Sir John Moore, "one of the grandest figures that ever adorned our Valhalla," as Sir Frederick Maurice describes him. "Death perhaps alone decided," says Sir John Fortescue, "that the highest fame should fall to Wellesley." When he was a boy of fourteen his father wrote of him, "He dances, fences, and rides with uncommon address." Later he became a fine horseman, a good swordsman, and a good shot. During his career of almost continuous compaigning he always enjoyed an iron constitution by virtue of a simple, pure and active life.

Stonewall Jackson, whose campaigns have formed such a mine of instruction for soldiers, is an extreme example of a military hero to whom sport in all its forms was anathema. As a cadet at West Point, his only recreation seems to have been a rapid walk in the intervals between classes. Later, as a professor at the Virginia Military Institute, he joined in none of the outdoor recreations of the community. Colonel Henderson writes, "Jackson found no pleasure in rod or gun; and although fond of riding and a good horseman, he never appears to have joined in any of those equestrian sports to which the Virginians were much addicted. He neither followed the hunt nor tilted at the ring." But he kept himself physically fit, and his simple and strict habits fitted him to endure the hardships of campaigning.

Grant was the best horseman of his class at West Point,

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although not distinguished in studies. At 32 he resigned his commission and lived the life of a farmer for seven years until the Civil War broke out. He had the reputation of intemperate drinking. There is the well-known story of Lincoln's reply to a deputation which asked for Grant's removal on this account—"Find out the brand of whisky he drinks and I will send kegs of it to the other generals." Grant's operations, though ultimately successful, incurred a terrible cost in human life. His strategy always reminds me of the story of Frederick the Great who, passing an old chateau in Silesia, saw on the gate a crest in which two stags were fighting with horns interlocked. Underneath was the motto "Le plus abstiné l'emporte." "That is the truest source of success," cried Frederick.

Lord Roberts was a fine horseman. He loved a good horse all his life, and was especially fond of Arabs. When he was a horse artillery subaltern he used to try his hand at riding all the horses in his troop, which were not the quiet and well-broken animals of the present day; and he rode in the officers' team for the regimental brake. When on leave from India he hunted with the Curraghmore hounds. He was fond of pig-sticking, and he speaks in his autobiography of excellent sport with wild boar when he was sixty years of age. It was at that age that he speared a wounded boar in the nick of time, which was attacking Pertab Sing, who had been thrown from his horse. He did not consider himself a first-rate shot, but he enjoyed shooting and had some tigers to his credit.

Neither as a cadet and young subaltern nor in later life did Lord Kitchener care for games. At Woolwich he and a friend studied Hebrew, and would spend their evenings trying to learn parts of the Old Testament in the original—an unusual recreation for gentlemen cadets, as Sir George Arthur remarks. All his life he was very fond of riding, and he cared a great deal for horses. As a junior subaltern he attained proficiency in tent-pegging. Whilst engaged on the survey of Cyprus, he acted as whip to a pack of hounds—but he could not be described as a keen hunting man. He distinguished himself "across the sticks" by winning a steeplechase at the Nicosia meeting in 1882. This seems, however, to have been his sole exploit on the racecourse. He cared nothing for

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horse racing or any mounted sport. In Egypt he never joined in polo matches or paper-chases, which were a common recreation of his brother officers, but he often went on shooting trips. Sir George Arthur writes thus of him at the age of 33, when he was second in command of the Egyptian cavalry—"The club, the ball-room and the racecourse had little attraction for an officer who hated gossip and revelled in work; who found his recreation in nature, or art, or genuine sport, and who took his profession seriously and laboriously . . . . His outlook upon life was that of one who had scarcely tasted the ordinary pleasures of youth."[1] Against this, it is to be borne in mind that Kitchener had risked his life from early years among lawless tribes, and had roughed it in the desert. Frederick the Great kept apes and other wild animals in his rooms, and his greyhounds slept in his bed. Lord Kitchener, the antithesis of Frederick in almost every phase of his personal character, apparently drew the line at bears. A pet bear was one of the inmates of a house which Kitchener once shared with Lord John Kennedy, a young officer in the Cyprus Police. One night the bear took a plunge in Lord Kitchener's bath and then retired to his bed to dry himself among the blankets. Lord Kitchener insisted on its immediate expulsion from the establishment.

Foch was not much interested in sport, and, although he loved a country life, his recreations lay mainly in the direction of a change in intellectual work. His outlook is revealed in one of his remarks to his class at the Staff College—"One must take a wide view. You all know I hate blinkers. One must not have an exclusively military outlook." But Foch was a highly accomplished horseman and he was fond of shooting, and he was physically very strong and active. A British officer at his headquarters wrote of him, "In his habits the Marshal was quiet and unassuming. He used to ride or walk alone, or accompanied by one officer." That Foch, at his age, stood the tremendous strain of the war so well, must have been largely due to his simple and regular habits.

[1] These remarks remind one of the point of view so ably advocated, in his autobiography, by our gifted Colonel Commandant, Lieutenant-General Sir G. F. MacMunn. The officer for whom, amid all the glamour of India, "the polo ground, the barracks and the mess house form a padded room of his own," he dubs "Mr. No Eyes". Again, "It was all so fascinating and dramatic, if you could get your nose off the hockey and polo ground".

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He was anxiously cared for, too, by his personal staff, and is said to have slept out of bed on two nights only throughout the Great War. He once remarked that his staff packed him up like a parcel when he had to go from one place to another.

Of the seven Field-Marshals on the active list of our Army, not one is credited in *Who's Who* with any recreation. A veil is also drawn over the leisure occupations of the Generals, with the exception of two whose recreations are given as hunting, polo, shooting, fishing, and golf. But we do not need *Who's Who* to know that the modern commander who is physically unfit is a "rara avis" indeed, as, it may also be said, is the eminent general who excels to the degree of celebrity in any branch of sport or of the fine arts. No British general, I think, could be classed with Mr. Bernard Shaw, who describes his recreations as "anything but sport," nor, we may be quite sure, does any of them confine his exercise, as a certain very famous statesman was said to do, to polishing his eyeglass.

Gardening, in Bacon's words "the purest of human pleasures and greatest refreshment to the spirits of man," has been a favourite recreation of many great soldiers. The Emperor Diocletian, after twenty-one years of the cares of war and empire, built himself a house on the Dalmatian coast. Here he devoted himself to philosophic reflection and gardening, and resisted all attempts to induce him to return. Cincinnatus, twice dictator of Rome, was found cultivating his farm with his own hands when the messengers arrived to announce his election as consul. After signal service to his country, which included the infliction of a historic defeat upon the Aequi, he resigned power, and returned again to his rural employment. Stonewall Jackson was fond of working in his garden, and it was mainly in this way that his exercise was taken. From his early years Lord Kitchener loved a garden, working in it himself. It is said of him that, in the Great War, he worked Fitzgerald, his military secretary, as hard among the rose trees as among his letters at York House. Foch, too, loved his garden, and was particularly interested in forestry.

Scientific and philosophic hobbies are not common among soldiers. Alexander the Great was well read in the science and philosophy of his day. It is upon record that he wrote to his old

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tutor, Aristotle, remonstrating with him on the latter's publication of scientific works which made common knowledge of what Alexander held should be reserved for his own people. "I had rather excel the bulk of mankind," he wrote, "in the superior parts of learning than in the extent of power and dominion." Plutarch tells us that Alexander loved not only the theory but the practice of medicine, and he liked prescribing for his friends. He had, it would seem, but little sympathy for fellow practitioners, for he crucified a physician who had unsuccessfully ministered, in his last illness, to his friend Hephæstion. In this connection it is amusing to note that Wallenstein, when at the head of 60,000 men, and in the midst of a campaign with the enemy before him, dictated from headquarters the medical treatment of his poultry yard. In his intervals of retirement Wallenstein proved himself a model landowner and attended personally to the details of farming, although his magnificent style of life removed him far from such as the simple Cincinnatus. He also possessed considerable veterinary knowledge which he applied in the supervision of his great stud of horses. Wallenstein studied astrology, and, all his life, is said to have held the conviction that he might trust to the stars for indications as to his destiny. When he had attained such power that Ferdinand began to fear him, and sent envoys to remove him from his command, it was generally thought that it would be strange indeed if the General were to obey the Emperor. Yet Wallenstein acquiesced. Producing an astronomical calculation he said, "You may observe by the planets that the spirit of Maximilian predominates over the spirit of Ferdinand; I can attach no blame to the Emperor therefore; I shall obey." One suspects, however, that Wallenstein, on this occasion at least, was playing the role of the priest in the oracle.

Napoleon loved scientific and philosophic discussions, and his conversation seldom turned upon gay or humorous subjects, and never upon frivolous matters. Wellington was not much interested in science; he at least encouraged invention, for he was an early purchaser of a patent safety razor, which, by the way, he got for nothing, for the inventor, instead of cashing his cheque, had it framed.

Lord Kitchener was an archæologist of some distinction, and

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archæology never lost its charm for him. Whilst engaged on the survey of Palestine, he published "Lieutenant Kitchener's Guinea Book of Photographs of Biblical Sites." We may well believe that the considerable amount of archæological work, which came his way professionally, was a labour of love. General Smuts who, in addition to being a distinguished soldier, is, of course, a statesman of world-wide fame, finds recreation in philosophic research and has published a work on "Holism and Evolution." It was noted in the newspapers not long since that he was on an expedition to Tanganyika to collect butterflies.

Devotion to the fine arts is rare among great soldiers. In olden days art treasures often attracted the unwelcome attention of the victor in war, but it is to be feared that their intrinsic rather than their artistic value constituted the fascination for the soldier. Turenne's library and his art gallery were celebrated in his day, and so were the collections of many other conquerors. "Building was gratifying to Napoleon's imagination," says Bourrienne, "but he knew that monuments form a part of the history of nations, and that their duration bears witness to the civilization of their founders long after they have disappeared from the earth . . . . It was not the edifices themselves that he valued, but the historical recollections they perpetuate, the great names they consecrate, the great events they record . . . . he knew that the fine arts impart to great actions a lasting renown." Stonewall Jackson showed intense appreciation of the marvels of nature and of art. He told Lord Wolseley that in all his travels he had seen nothing so beautiful as the lancet windows in York Minster, and he was never tired of talking about the cathedrals of England. Lord Kitchener was a great lover of art. In Cyprus, while he was still in his twenties, he began to cultivate a taste for porcelain which never forsook him all his life. It is possible that the acquisition of the famous "peach bloom" vases, during his visit to China in 1909, gave him more satisfaction than winning a battle. He is said to have described his impressions of China and Japan by saying that "his preference for Chinese over Japanese art was equalled by his preference for Japanese over Chinese soldiers." During the Great War, when he was told that he was to be given the Legion of Honour, he said to the bearer of the news, "Tell your French

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friends not to give me the Legion of Honour; but persuade them to send me two pieces of Gobelins tapestry out of the Garde Meuble." He was a good craftsman at fine cabinet work. One of the last relaxations of his life was the repair and restoration of an old Italian ebony cabinet.

Decken wrote "The literary man loathes war because the Muses take to flight on hearing the din of arms." Be that as it may, the name of the soldiers who have enriched literature is legion. It seems, however, to be a fact that, if we except Xenophon and Julius Cæsar, no great literature has been produced by men who have been famous as soldiers. Cervantes, after a military career of merit was disabled for life at the battle of Lepanto. But he remarked, "the lance never blunts the pen," and he lived to write *Don Quixote*. Other soldiers who were not so distinguished in the military as in the literary art, are Socrates, Aeschylus, Sophocles, Horace (who commanded a legion), Dante, Chaucer, George Buchanan, Ben Jonson, Sir Philip Sidney, Davenant, Lovelace, Otway, Steele, Coleridge, Descartes and de la Rochefoucauld. Modern soldiers seem to write to a greater extent than their predecessors, but chiefly upon professional subjects. Foch has several military classics to his credit, and other names of famous soldier authors readily occur to us. The Lays of Ancient Rome are said to have been composed in the War Office, but this is by the way. Many great soldiers have been great readers—but not all. Cromwell, Marlborough and Clive are notable examples of famous leaders who read practically nothing, not even professional literature. The case of Cromwell is truly remarkable. He was certainly not the stuff of which the studious are made. "Some faint evidence may be traced of progress in mathematics; that he knew some of the common tags of Greek and Roman history," says Lord Morley. Till middle age his life was that of a sober, industrious farmer, devoted to his Bible and his plough. Leaving his farm at forty he became the "strongest man in England—virtually King of England," and the greatest general of his day. Relying upon his mother wit, he became a master of the art of war. The only military instruction he received appears to have been from a Dutch officer who taught him the elements of cavalry drill. His training in generalship was acquired in the field from the six years of active

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campaigning which fell to his lot before he held an independent command. Bacon said of Sir Edward Coke that "he conversed with books and not with men, who are the best books." Of Cromwell the reverse is true. "For him a single volume comprehended all literature, and that volume was the Bible." His advice to his own eldest son reveals his views—"I would have him mind and understand his business . . . . read a little history; study the mathematics and cosmography. . . . take heed of an unactive, vain spirit." Cromwell was an exception to the general rule in other ways too, for ambition and love of glory, which are sometimes put forward as essential in the make-up of a great general, were lacking in him.

One might have expected a man of Kitchener's solitary habits to be a great reader. He was not. Lord Esher records that, when a friend offered Lord Kitchener some books for the empty shelves of the Broome library, he replied "Give me old bindings; the books don't matter."

Alexander the Great was "a man of extensive reading. The Iliad, he thought, as well as called, a portable treasure of military knowledge; and he had a copy corrected by Aristotle. Onesicritus informs us that he used to lay it under his pillow with his sword. As he could not find many other books in the upper provinces of Asia, he wrote to Harpalus for a supply; who sent him the works of Philistus, most of the tragedies of Euripides, Sophocles, and Aeschylus, and the Dithyrambics of Telestus and Philoxenus. . . . A casket being one day brought him, which appeared one of the most curious and valuable things among the treasures and the whole equipage of Darius, he asked his friends what they thought most worthy to be put in it. Different things were proposed, but he said the Iliad most deserved such a case." Julius Cæsar, when taken prisoner by pirates in his youth, employed his enforced leisure, while awaiting ransom, in writing poems and orations. When he rehearsed them to the pirates and they expressed no admiration, he called them dunces and barbarians, and threatened to crucify them—which last jest from their prisoner delighted them. But, after his escape, he organized an expedition against them, captured them, and actually did crucify them. Plutarch declares that Cæsar "was the second orator in Rome; and he might have been the first,

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had he not rather chosen pre-eminence in arms." Cæsar is said to have written an essay on Latin rhetoric while crossing the Alps at the head of his army. As a historian Cæsar is by many considered never to have been surpassed in simplicity, directness, and dignity.

Of Hannibal, Cornelius Nepos wrote, "This great man, though occupied in such vast military operations, devoted a portion of his time to literature, for there are some books of his written in the Greek language." It is known that he had a Macedonian tutor with him on his campaigns to teach him Greek, and that he was imbued with Greek as well as Carthaginian culture.

Turenne was no reader. He has been described as "little more than a simple and honourable soldier, endowed with much tact, but in the world of politics and intellect almost helpless in the hands of a skilful intriguer or casuist. His life was spent among the troops." Turenne's character is in contrast to that of his contemporary Condé who, in private life, was harsh and unamiable, seeking only the gratification of his own pleasures and desires. His fame rests upon his military genius alone. In his old age he cultivated the society of men of letters, notably Boileau, Racine and Moliere. Gustavus Adolphus was a remarkable linguist, speaking and writing five languages fluently, and he was well grounded in classics. Suvoroff was an intelligent and keen reader even on campaigns.

Frederick the Great was fond of literature, and he was ambitious of literary fame, especially desiring celebrity as a writer of French. He wrote a number of books which, however, would hardly have survived had it not been for their distinguished authorship. In his young days he composed a treatise entitled "Anti Machiavel," "an edifying homily," says Macaulay, "against rapacity, perfidy, arbitrary government, unjust war; in short against almost everything for which its author is now remembered among men." Among his other works were a "History of His Own Times," "History of the Seven Years War," and "Military Instructions." He also wrote an immense number of bad verses. He translated and published Bayle's Dictionary, which was one of his especial favourites. He encouraged authors, invited distinguished foreign writers and philosophers to his court, and made them his favourite companions. Voltaire was a bosom friend for ten years and was created a royal

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chamberlain at his court with a liberal pension for life. His favourite authors were, besides Bayle and Voltaire (whom Napoleon detested), Rousseau, Rollin, Fleury, Malebranch, and Locke. It was a saying of his that "books made up no small part of true happiness," and, in his old age, he said "My last passion will be for literature." Frederick had a fine ear and was fond of music. He performed skilfully upon the flute, which he played as he walked, and which he declared aided reflection and gave rise to new thoughts.

Wellington also had a taste for music. When a subaltern he was fond of playing the violin, but "left it off on becoming a field officer, and disliked any reference to his accomplishment." In later years he used to accompany Madame de Lieven, playing Hanoverian waltzes on the piano, on the triangle. He liked concerts and was a patron of the opera. Wellington was an extensive reader, his principal favourites being Clarendon, Bishop Butler, Smith's "Wealth of Nations," Hume, the Archduke Charles, Leslie, and the Bible. He was also much interested in English and French memoirs. Gleig records that at Walmer the Bible, the Prayer Book, Taylor's "Holy Living and Dying," and Cæsar's Commentaries always lay within the Duke's reach, and that they were all heavily marked and annotated by him. Although it hardly comes under the heading of literature, it is of interest to note that Wellington drew up the heads of the Dublin Police Bill (being still Secretary for Ireland) when lying off the mouth of the Mondego, with Junot and the French Army waiting for him on shore. Blucher's favourite book was Klopstock's "Messiah." He does not seem to have been an intellectual man. There is the story, which reveals a sense of humour at least, of how Blucher made a bet in a London drawing room that he was the only man present who could kiss his own head. He won the wager by walking up to Gneisenau and giving him a smacking kiss on both cheeks.

Napoleon was an omnivorous reader. At Brienne, Bourrienne relates, "during play hours he withdrew to the library where he read, with great eagerness, books of history. . . . I often left him in the library to join the sports of my companions. . . . He had no tastes for the study of languages, polite literature, or the fine arts." The habit of reading, formed thus early, he cultivated through life.

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As a young lieutenant at Valence he spent most of his leisure reading and re-reading the library there. On his campaigns he read constantly. He carried Plutarch with him for twenty years, and read the life of Cæsar on the eve of many a battle. At Waterloo he had with him his travelling library of four hundred volumes. His range of reading was wide, and, apart from history, included Homer, Virgil, Tasso, novels of all countries, mathematics, legislature, and theology. At St. Helena he devoured books—history, philosophy, strategy, memoirs—of the last alone he read seventy-two volumes in a year. He often praised Homer and Ossian. It is on record that he said to an officer on board the Bellerophon "Read again the poet of Achilles; devour Ossian. Those are the poets who lift up the soul, and give a man a colossal greatness." He also read Milton carefully, and Sir Colin Campbell relates that Napoleon told him at Elba that his dispositions at Austerlitz were suggested to his mind by the description of Satan's conduct of the battle with Heaven in the Sixth Book of "Paradise Lost." That he regarded reading as an essential means of training for war, we all know—"Read and re-read the eighty-eight campaigns of Alexander, Hannibal, Cæsar, Gustavus, Turenne, Eugene, and Frederick."

Stonewall Jackson's range of literature was not wide. He was chiefly interested in history, Plutarch, Josephus, Hallam, and Macaulay being among his favourite authors. His books were full of pencil marks made with a view to future reference. When Grant lost all his money in his old age and was dying from cancer in the throat, he wrote his Personal Memoirs to keep the wolf from the door, and these rank among the best military biographies.

The elder von Moltke's tastes inclined him to literature and historical study as well as to travel. He published a short romance, "The Two Friends," when he was twenty-seven, and also some political and social essays. When he was thirty-two he contracted to translate Gibbon's "Decline and Fall" into German, for which he was to receive £75, his object being to earn money to buy a horse. In eighteen months he had finished nine volumes out of twelve, but his publisher failed to produce the book and von Moltke never received more than £25. He also published "Letters on Conditions and Events in Turkey in the years 1835 to 1839," of which it is said that no other book of travels better deserves to be regarded as a German classic.

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Lord Wolseley wrote all through his life. Among his books are "The Decline and Fall of Napoleon," "Life of Marlborough," "Story of a Soldier's Life," and "Narrative of the War with China."

Some generals have written verse, but I do not think any general has been a poet. General Wolfe, during the fighting before Quebec, remarked that he would sooner have written Gray's Elegy than take Quebec. Curiously the poet Gray, on the other hand, was passionately fond of military history and longed for a life of action. Wolfe had a keen appreciation of a wide range of literature. During his life in barracks he was constantly engaged in broadening his intellect, and he hired tutors to teach him French, Latin, and Mathematics. He is said to have drawn inspiration from Xenophon's Cyropœdia, as did Gustavus and Scipio—who carried this book on all his campaigns.

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It is not necessary for us to have the command of an army as our goal, in order to learn from the lives of the great captains. We all aspire to lead men. We all hope not to waste lives which have been entrusted to our care. That is enough. We must keep an ideal before us, and endeavour to attain it. That ideal is provided by the lives of our great predecessors in arms. I did not begin to write these notes with the object of drawing a moral, but perhaps there is something to be learnt from them, fragmentary as they are. If any lesson may be drawn from a scrutiny, however fleeting, of the private lives of men, in the military as in any walk of life, it is that "the wear and tear of rust is faster than the wear and tear of work." Now it is the officer's brain that is in danger of rusting in times of peace—not, in our Army at least, his body. Colonel Henderson, who inspired the last generation of our leaders, wrote in 1903 that the strong nerves and clear wits engendered by sport and games went for little in the field, when allied with ignorance and undeveloped intellect. Is not one lesson, then, that an officer's leisure should not be solely devoted to the pursuit of a ball or a wild animal? Is not another that pleasure must be subordinated to duty?

Said Voltaire, "With me, as you know, the great men come first, and the military heroes last. I call those men great who have

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distinguished themselves in useful or constructive pursuits; the others who ravage and subdue provinces, are merely heroes."

Voltaire, great man as he himself was, made many prejudiced and misleading statements—of which this is one. Some great soldiers have not been great men, but very many have been. Especially was Voltaire wrong in regard to the British Army which, after all, is the finest Army the world has seen. I cannot think of one great British soldier—and we have a glorious roll of great soldiers—who was not also a great man in the best sense of the term, and a great servant of the state.

This short study, incomplete as it is, indicates a vast diversity of character among great captains. Is there, then, no standard by which a great commander may be judged but by his victories? Let us turn to our "Field Service Regulations." Here we find set forth the qualities of the ideal commander—"personal courage, a strong and resolute will, and a ready acceptance of responsibility. . . . knowledge. . . swift and clear judgment, imagination coupled with an equal mind, an understanding of human nature. . . . strong personality, a well-balanced sense of proportion." A formidable list, yet admirable in its restraint. It leaves much unsaid, but to say more would be to enter upon debatable ground.

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THE STUDY OF EUROPEAN LANGUAGES.

By Captain A. G. Miller, R.A., *p.s.c.*

Part I.

The essential preliminaries.

1. Introduction.
2. Selection of a suitable language.
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10. Revision.

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PART I.

THE ESSENTIAL PRELIMINARIES.

1. *Introduction.*

The hardest struggle in the learning of a foreign language is probably during the period of preparation for the Preliminary Examination. During this period almost every grammatical difficulty is met with; interest has to be more or less artificially maintained—since the pleasures of varied reading and interesting conversation are necessarily denied—and most of the time is devoted to the attainment of a certain mechanical efficiency in learning words, following rules and recognizing exceptions to them. Against this, it may at once be said that if the student devotes an hour or so a day regularly to the study of the language, the period need not be a long one—say about six months for a language of average difficulty like French. The preliminary examination, moreover, is held mainly to discover whether a candidate is sufficiently well prepared—and shows a likely degree of aptitude—to warrant the continuance of his study of the language in the foreign country, at the expense of his normal military duties. Once the preliminary examination has been passed, the student who can proceed to the foreign country will find progress much more rapid, and interest more easily maintained. Even if, at the end of the period abroad, a 1st Class Interpretership is not obtained, the student will still have the satisfaction of having accomplished something well worth while. He will have some experience of the foreign country and its people. In general education he cannot fail to benefit, while the knowledge of the language he has obtained is not labour thrown away, since subsequently it may be perfected.

2. *Selection of a suitable language.*

The choice of a foreign language is more often than not dictated by personal taste. For anyone who has no preconceived ideas on the subject, the first consideration will probably be the difficulty of the language. It is generally agreed that Spanish is easier than Italian, and French rather more difficult than either of these, but not as a rule so hard as German. In this respect, however, indi-

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viduals vary considerably, and it would probably be misleading to make more concrete comparisons. The difficulty, too, is dependent on the amount of ground work that has already been covered. The grammar, for example, of a language that has been learned at school will save a certain amount of preliminary work, and will tide over the otherwise inevitable period of comparatively dull and mechanical memorizing. The second consideration relates to the people whose language it is proposed to study. It is naturally more difficult to learn the language of a people towards which one feels an insuperable antipathy. A knowledge of their language, however, often provides the opportunity of seeing and appreciating the point of view of a foreign race, and should help one to judge dispassionately. Without it, one's attention is drawn more often to the points of mutual conflict than those of mutual agreement. All other things being equal, Army Orders which lay down the interpretership rewards and number of vacancies for officers required to proceed abroad on language study, will prove a useful guide. The reward itself is more or less proportionate to the difficulty of the language. The cost of lessons varies roughly in the same relation but, as the reward also reflects the demand for interpreters in certain languages, one has at any rate some gauge as to the relative military importance of the different languages.

3. *Choice of a method of study.*

Courses at London University for Army officers are held in certain foreign languages as laid down in Army Orders from time to time. As these courses normally start from the very elementary stages and no previous knowledge of the language is required, nothing further need be said about them. It will be obvious that to concentrate the whole of one's time on such a course will lead to rapid progress, and difficulties will be easily overcome. For those, however, who may be unable to attend such courses, the choice of a method of study sometimes presents a real difficulty. The inconvenience of continual visits to a language teacher is also often an apparently insuperable obstacle. Further, the cost of private lessons, varying between three and ten shillings an hour—to which travelling expenses may be added—might prove too great a financial strain. With good text books and a little perseverance,

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much of this trouble and expense can be avoided. In the actual selection of the books—or one of the numerous courses advertised in the press—it is advisable to ensure that certain requirements are fulfilled. Firstly, it is preferable in the early stages to avoid books that contain few exercises and a large amount of grammar. The most elementary text books with numerous exercises will provide practice in the important rules. The inevitable exceptions can be more easily dealt with at a later stage, and interest in the language is not sacrificed in the attempt to commit to memory an excessive number of minor grammatical niceties, a knowledge of which is eventually acquired without apparent effort. Secondly, it is essential to have a "key" to all the exercises, in order to correct mistakes as soon as possible and so avoid "practising mistakes". The "key" is further useful in providing a number of additional exercises for translation in the reverse direction, the text-book exercises serving as the "key" for purposes of checking. Thirdly, some simple method of imitated pronunciation will prove extremely valuable in helping the student to pronounce more or less correctly from the beginning. Fourthly, in a language which is written in peculiar characters, it is important to have some illustrations of the handwriting, in which the maximum amount of practice is desirable from the commencement of study. Finally, it is as well to bear in mind that systems of study exclusively of the "pictorial" type, or entirely in the foreign language—although they facilitate early "thinking in the language"—tend to overlook the necessity for rapid translation from and into English, which is the eventual aim of the interpreter. For this reason, such systems should be chosen with particular care and supplemented, if necessary, by the more orthodox methods.

PART II.

PREPARATION FOR THE PRELIMINARY EXAMINATION.

1. Introduction.

The usual difficulty throughout the study of a foreign language is not so much to understand what is written in the language as to translate accurately from English into it. For this reason special attention has to be paid to translations into the language. In this

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connection, once a commencement has been made with a selected method of study, some definite procedure should be adopted with a view to checking and noting the grammatical errors that occur, with a view to their gradual elimination. If special characters are used, the handwriting of the language should invariably be used from the earliest stages. This is of value, not only in perfecting the handwriting and developing something better than a characterless or childish copy-book style, but also in the practice it affords in reading during the correction of the exercise.

2. *Checking and noting mistakes.*

The checking of mistakes by the "key" to the exercises offers no difficulty, unless the "key" appears to be wrong—not so uncommon an occurrence as one might imagine. In such a case it is as well not to waste too much time searching for the explanation. Few grammars are faultless; misprints sometimes occur; occasionally a rule, or a word not yet met in the vocabulary, is found in a later exercise. The discrepancy, if noted or marked in some distinctive way, can be queried later on, when a teacher becomes available. It is hardly necessary to point out that a continual succession of such discrepancies indicates that some important rule has not been mastered, and it would be unwise to proceed until an explanation has been found. In the event of a complete deadlock, the advice of a teacher must be sought, unless the publisher of the book can be persuaded to provide the explanation. The noting of errors in grammar or spelling can best be done by marking the "key" and the appropriate rule in the grammar. It is useful—particularly for purposes of later revision—to mark also in the text-book the part of the exercise in which mistakes have been made. The whole of every exercise need not then be completed during the final revision. This system has the further advantage of acting as a break on hasty or careless work, since an excess of marking in the text-book indicates that important rules have been overlooked. Mistakes are perhaps discouraging but if they are always analysed they concentrate attention on the rules, and are therefore much more helpful than they at first appear. For this reason mistakes corrected by oneself are more instructive than those pointed out by an indifferent teacher To this end it may

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be noted that the "key" can be well used for finding the mistakes, leaving them at first uncorrected. Then, working through the faulty parts of the exercise again the correct version can often be inserted before final checking by the "key". The appropriate rules thus become more firmly fixed in one's memory.

3. *Pronunciation.*

A fair pronunciation can generally be acquired by following the imitated pronunciation of a text-book. As in other matters, the main essential is practice. Without a teacher, practice may yet be obtained by pronouncing—if not aloud, at any rate with the tongue and lips—each word that is read or written. If attention is paid to this from the beginning, it soon becomes habitual, and a pronunciation can be acquired—sufficiently good as a rule to enable the student to pass the preliminary examination. In most languages, however, it will be best to secure the early advice of a teacher so that gross errors of pronunciation are not persisted in. Minor errors are afterwards easily eliminated, the more difficult sounds can then be perfected, and above all the greater part of the otherwise tiresome study of pronunciation will soon be mastered.

4. *Reading.*

After working through the first few lessons of the grammar, a reader is required. The book should be selected for its simplicity. The reading matter is of comparatively minor importance, but easy reference to a vocabulary, e.g., inter-linear or inter-paginal, leads to a considerable saving of time in the search for words. The use of such a reader is an aid to the increase of one's vocabulary and provides a relief from the monotony of the grammar exercises. Words that have not previously been met should be constantly noted down and learned. It is also advisable to read through each piece several times, until the words become familiar in the appropriate context. If the words that are not known at the first reading are underlined, some indication of progress will be available on subsequent reading. Although in a simple language the progress from a reader to ordinary books is comparatively rapid, one must resist the temptation to concentrate on reading to the exclusion of grammar exercises, at any rate until the preliminary examination has been passed.

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5. *Conversation.*

Conversation is generally impossible to practise without a teacher, but a great deal can be done by the student to facilitate his subsequent efforts at conversation, thereby reducing to a minimum the number of lessons it is necessary to have. In conversation one has not only to cultivate a fluent expression of one's thoughts, but—especially in the preliminary stages of learning—to accustom one's ear to the language. The former can be ensured to some extent by summarizing in the foreign language passages or short stories one has read, and by simple letter writing about one's everyday occupations. Such compositions can then be memorized. It is hardly necessary to state that the student's summaries of stories and events require correction by a qualified teacher before they are committed to memory. As, however, such work can be sent for correction by post, the student will still be saved the trouble of a visit to a teacher—usually the most difficult problem for a soldier, who is seldom stationed in a district where foreign language teachers are accessible. The simplest way to accustom one's ear to the language, excepting actual conversation, is by reading aloud. This practice may give rise to doubts as to one's sanity, but it is recognized as a successful method and has the further advantage that it accustoms the student to pronouncing without hesitation. In some languages, gramophone records are available and are extremely useful for attuning the ear to the language. As a rule, however, the records are expensive, and the student must calculate for himself how many hours of personal tuition they represent and whether they are worth while. In any case, it should be remembered that practice in pronouncing is equally as important as recognising the words that are spoken.

6. *The importance of a teacher.*

Lessons from a language teacher can generally be dispensed with until the grammar has been worked through for the first time, although it is obviously preferable to have incipient errors of pronunciation corrected at an earlier stage if possible. After the grammar has been completed, however, it is usually desirable to find a teacher in order to have a few difficulties explained. If this should prove unnecessary, one may conclude that both the text-

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book and the student are above the average. Without maligning any of the professional teachers of foreign languages, one may say that not every native is gifted with the art of teaching. Moreover, a teacher who has not had the opportunity of following a student's progress cannot be expected to discover at once the points on which emphasis must be laid. For these reasons, it is advisable to go to a teacher for the first lessons with a definite programme of questions, such as inexplicable difficulties encountered in the grammar and enquiries as to details of pronunciation. If no particular difficulties have arisen, a short letter or free composition should be taken for correction, after which a little reading, dictation and conversation can be practised. The student is frequently inclined to expect too much of a teacher and consequently to place too high a value on securing one. In reality, since it is the student who has got to do the learning, a teacher is chiefly of assistance in pointing out mistakes which cannot otherwise be corrected, and more particularly for conversational practice. In the interests of economy, therefore, full use should be made of the time spent with a teacher, and lessons should not be wasted in doing work which can equally well be done by the student alone.

7. *Acquiring a vocabulary.*

To acquire a vocabulary is necessarily tedious at the start, as words must be more or less forcibly memorized. Most text-books have a list of words at the beginning of each exercise. An endeavour should be made to learn these words and to complete the exercise without referring to the list—leaving blank spaces if necessary. Before the exercise is corrected the blank spaces can then be filled in from the vocabulary, and attention is automatically drawn to words not thoroughly known. For the preliminary examination a vocabulary of 1200 to 1500 words is approximately what is required. The majority of grammar text-books contain nearly 1000 and the remainder can be picked up in the course of one's reading. There are various systems of learning words. One of the most popular methods is to write each unfamiliar word on a blank visiting card—English on one side, the foreign word on the other. These can then be read through from time to time until they become familiar. Among the advantages of this method are that

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derivatives of the same root word can be entered on the same card, a few cards can always be carried in the pocket, and the cards of words that have been memorized can be put away for later revision. Other methods can easily be devised according to the inclinations of the student. It is, however, worth remembering that the actual process of writing down the foreign words helps to impress them on the memory. There is little that can be done to help in the mechanical process of committing words to memory. The learning of phrases and passages by heart is of some assistance, since the words are then presented in an appropriate context. Words may be connected by the association of ideas, e.g., in French "to run" —runner—courier—"courir," or e.g., in German "train"—pull—tug—"Zug". Eventually, however, all these methods prove unnecessary, since words are associated in their correct meaning by constant familiarity with them through conversation and above all through reading. It is necessary to add that care should be taken to learn words "both ways", i.e., from English into the foreign language and vice versâ. The tendency is to learn words always from English into the foreign language, with the result that translations into English, unless constantly practised, are often badly rendered. This is, perhaps, not so important in the early stages of preparation for the preliminary examination, but it should be borne in mind, particularly if one is fortunate enough to be studying in the foreign country.

8. *Revision.*

By the time the grammar text-book has been completed, the student will begin to feel that considerable progress has been made, but many of the earlier rules will already have escaped his memory and revision is essential. If the grammatical errors previously made have already been noted in the text-book, the whole of each exercise need not be written out again. Written work can be confined to re-translating the sentences in which mistakes have been made. In order to cultivate a certain amount of fluency, however, it is as well to supplement the written translation of doubtful parts of the exercise by oral translation of the remainder.

Towards the approach of the examination, particular attention should be devoted to improving one's vocabulary by the revision

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of all the words that have already been learned. It is surprising how quickly many of them are forgotten. The student will now realise which are the weak points to which special attention must be paid, and can deal with them accordingly. If opportunities for conversation have been lacking, it will be essential to pay a few extra visits to a teacher prior to the examination. It must be remembered that the marks available for conversation represent 50 per cent of the total. Finally, it may be some encouragement to know that the preliminary examination has been passed by students who have paid less than a dozen visits to a teacher and have had no more practice in the language than has already been outlined.

PART III.

PREPARATION FOR THE INTERPRETERSHIP EXAMINATION.

1. *Introduction.*

The language student who has passed the preliminary examination can obtain permission to continue the study of the language abroad, if he is otherwise eligible, as laid down in the Regulations for the Study of Foreign Languages. For anyone who may be unable to proceed abroad, the remarks below may be of some value, but the likelihood of being able to reach a 1st Class Interpretership standard purely by study at home is somewhat remote. The chief difficulty for the student at home is, of course, due to the absence of those surroundings in which one is obliged to express oneself in the foreign language, and where the eye and ear subconsciously assist in the learning of it. Moreover, the increasing importance of assistance from a teacher renders the expense of learning at home usually far greater than that of learning abroad. In any case there is no short cut to success. A certain amount of time must be devoted to each part of the syllabus of the examination, and particular care should be taken to ensure that no section of it is neglected. A suggested initial weekly programme of work is given in the Appendix at the end of the article.

2. *Translation into the foreign language.*

As an obvious difficulty occurs in translating into the foreign language, it is advisable to translate a piece, approximately of ex-

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amination length (20 to 25 lines) every day. This is of somewhat more importance than free composition, since the necessity for rendering the exact equivalent of the English ensures some increase in one's vocabulary; whereas, in free composition, the greater latitude permissible in the choice of words calls for less practice and is less instructive. It is as well to adopt a systematic procedure in translation work, in order to facilitate later revision. The following is suggested as an example. All translations are done first in a rough exercise book, in which the teacher can make the necessary corrections and marginal notes. Each exercise is then copied into a "fair copy" book where all words and phrases in which mistakes were made in the original are plainly marked, e.g., underlined in red. A generous margin in the "fair copy" book will serve for entering, where necessary, the corresponding English word or phrase, which can subsequently be referred to without the bother of looking up the English original. To facilitate reference to the original, however, the book and page from which the translation has been made should be noted at the beginning of each exercise. The above method involves considerable time and trouble, but it offers certain compensating advantages. The attention thus paid to a corrected phase, by the mere process of writing and underlining, helps to impress it on one's memory. The more difficult passages and idiomatic expressions are clearly indicated in the copy book and—if the English is beside them in the margin—revision exercises can be confined to these outstanding points. Grammatical errors are also clearly shown, and an occasional glance through the copy book shows not only the progress that is being made in this respect, but calls attention to repeated mistakes in the same rule. Further, the copy book serves a useful purpose for translations from the foreign language into English, the desirability of which is referred to later on. If the grammar text-book (mentioned in Part II) has already been mastered except for a few minor details, it will now be of use chiefly as a reference book, and perfection in grammar will unconsciously be attained largely by frequent and varied translations. The work will now become increasingly more interesting and less mechanical, but it is of such a nature that a "key" will seldom be available. The services of a teacher, therefore, can no longer be dispensed with to

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the same extent as previously. It is perhaps permissible to draw attention, however, to the previous remarks on teachers (since some readers may not have been interested in the notes on preparation for the preliminary examination) and to emphasize that the number of lessons or teachers has not necessarily any direct relation to the knowledge one is likely to attain. If the student is unable to secure a teacher, good practice can still be obtained by translating suitable passages from the foreign language into English, subsequently using the original as a "key" to check the translation back from English into the foreign language. This method, incidentally, will clearly illustrate the necessity for care and precision when translating into English, and may occasionally be practised with advantage by every student. It is not only an economy; it is highly instructive and the readiest method of acquiring a good style.

3. *Free Composition.*

It should be noted that the syllabus stipulates a "letter" in the foreign language, hence essays should generally be written in this form, so that suitable introductions and conclusions to the letter may be chosen according to the subject. Appropriate opening and concluding remarks then come readily to mind, and time is not wasted in the examination by a tiresome search for such ordinary phrases. Moreover, this will obviate the unfortunate mistake that sometimes arises in the stress of an examination: failing to write in the form of a letter. The examiner is then left in doubt as to whether the candidate knows the correct form of address or not, and might consider the omission a serious one. It is not easy to suggest how often a student should practise free composition, as so much depends on the talent of the individual. In any case, one or two essays or letters should be written every week (see Appendix). For those who find any difficulty in writing essays in English, of course more practise will be necessary. In the examination itself, one is well advised to avoid any expressions of which one is in doubt as to the idiomatic or grammatical correctness. In preparing for the examination, however, the opposite view should be taken, as otherwise it is well nigh impossible to attain a free and flowing style with well-chosen phrases to express the exact

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shade of meaning it is intended to convey. If in doubt, a literal translation of the English is usually the correct rendering.[1] With regard to the matter for free composition, it is best at first to choose subjects that have been set at previous examinations, the published papers of which can be obtained from His Majesty's Stationery Office through any bookseller. Essays on historical, political, or economic questions of particular interest to the people whose language is being studied, should be attempted as well as those of purely military interest. This will not only ensure a wider choice in the examination, but will probably add to one's knowledge of the subject by eliciting the views of the native teacher. Moreover, the practice afforded by such essays will increase one's vocabulary and provide additional interest in following the current problems of the day in the press of the foreign country. This last is of particular importance in offering an easy opening to conversation, both with people in the foreign country and incidentally with the examiner.

4. *Extempore composition and translation.*

These tests, which are read approximately at dictation speed for translation into the appropriate language, do not present any particular difficulty if they have been regularly practised. Here again, greater attention has to be paid to translation into the foreign language. It is consequently advisable to do three or four passages into the foreign language for every passage into English. In order that this part of the syllabus should not be overlooked—the total marks obtainable are equal to those for the "technical" paper—a short period should be devoted to it every day if possible (see Appendix). In the early stages of preparation for the examination, however, a great deal of time should not be wasted on such practice, since facility in ordinary translation will not have been attained. In the later stages, prior to the examination, more time may be spent on it with real advantage to the student.

The passages selected for translation can be varied in respect of difficulty as progress is made. It is important to bear in mind, though, that military passages are not set in this part of the examin-

[1] This is particularly noticeable in translating passages from authors with a more stilted style, and is explained by the fact that the less colloquial the language, the less idiomatic are the expressions.

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ation, and that the most difficult pieces are those containing the numerous grammatical irregularities and idiomatic expressions, such as occur in simple stories and conversation. Speed is essential, both in translation and in the mechanical process of writing, where peculiar characters are used, e.g., in Russian. Practice should therefore be secured as nearly as possible under examining conditions. The teacher, for example, should not be allowed to correct mistakes during the course of the reading—a temptation which few teachers can resist. The student should likewise endeavour not to interrupt the reading, leaving blank spaces for words and phases not known and filling them in later when looking over the work.

5. *Translation into English.*

Little emphasis has been laid on translation from the foreign language into English. At the same time it is curious to note that some candidates, who otherwise show a good knowledge of the language, secure less marks than they anticipate in this part of the examination. It may be that, through continued practice in writing and conversation in the foreign language, the appropriate English expressions do not come readily to the mind, although the meaning of the foreign words is perfectly clear. Idiomatic phrases are consequently not always turned into the best English, and the requisite precision in translation is lacking. To avoid slackness in this respect, the fair copies of translations into the language (referred to in para. 2 above) are of use for translating back into English. Provided the extracts have been selected from good authors, the English can then be corrected by comparison with the original. When the student is living in the foreign country, completely divorced from English society, such exercises are essential, say once a week. The system is, of course, of particular value when the native teacher has not a very good command of the English language.

6. *Dictation.*

Although dictation no longer finds a place in the syllabus of examination, its value is not to be under-estimated. Its chief use is in the elimination of minor grammatical errors such as one might make in composition or conversation. In the early stages of study,

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it helps to tune the ear to the sound of the foreign language, and consequently leads to a quicker understanding of conversation to which one takes so long at first to accustom oneself. In the final stages of preparation, dictation can practically be dispensed with, since grammatical errors are constantly checked in other ways, e.g., in translations. Moreover, the time can more usefully be spent in extempore composition and translation, which together cover most of the ground covered by dictation.

7. *Technical knowledge.*

No reference has yet been made to a technical military knowledge of the language. This omission has been intentional, chiefly with the object of dealing with the subject under one heading but partly to stress the fact that technical knowledge is an acquirement over and above the fundamental knowledge of the language. Hence technical military terms and expressions are best avoided in the initial period of preparation for the interpretership examination, for they can more easily be acquired when the ground work has been thoroughly prepared.

The importance of a technical military knowledge of the language is evident, from a study of the syllabus, both in the written and oral parts of the examination. After the first month or so in the foreign country, it is consequently essential to allot an increasingly larger proportion of one's time to the translation of military passages in the reading of foreign military works. For the written part of the examination, suitable passages for translation, both from and into English, are to be found in such publications as the official histories of the Great War and the various regimental histories and journals. The acquisition of other technical terms can be ensured by reading and occasional translation from the foreign and English "Field Service Regulations", training manuals (war) of the arm of service of the student, and from other military works and journals. Any unfamiliar terms, especially the more modern ones, should be noted so that they may later be memorized. The most important terms to concentrate on are those that would arise in the various phases of a campaign, and such as are constantly met in descriptive accounts of active operations. Certain other technical terms are mentioned in the syllabus. With regard to weapons,

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the main parts common to most weapons should be known, but a detailed knowledge of the nomenclature of the numerous small parts, e.g., of a machine gun, is of negligible importance. Practice in reading the conventional signs, etc., on maps used in the foreign country should not be overlooked.

The syllabus particularly stipulates testing by "oral translation from a British or foreign training manual." This is a severe test, and one of exceptional difficulty if it has altogether been neglected. On the other hand, once the common phrases—that are necessarily so often repeated in regulations—have been mastered, such translations are comparatively simple. In this connection, the student would be well advised also to practise oral summarizing in the foreign language of passages selected at random in the foreign regulations. Reading of manuscript now forms part of the oral examination. It is unnecessary to stress the importance of frequent practice in order to attain fluency in reading, still more so when fluency in reading aloud is demanded, together with the dictation of suitable replies.

8. *Reading.*

Reading is probably the greatest aid to the maintenance of interest in a foreign language. It is a relief to the monotony of translation and composition and a change from the mental gymnastics that conversation at first entails. On this account, it is excusable to indulge in it. Instead of laboriously searching for every word in the dictionary, reliance may be placed on a little guesswork—once the elementary stage has been passed. A few sentences on each page, selected for careful reading and analysis, will check too great a tendency to haste. It is advisable always to underline an unfamiliar word. One can then see at a glance what progress is being made and, if a page appears thoroughly mutilated in this way, it is obviously time to go over it again and translate it properly. Otherwise, one is just reading print and learning nothing. Some students choose to enter in the margin a word that has been looked up in the dictionary, thereby saving time spent on searching for words during revision.

Apart from the reading of technical military publications, the choice of reading matter is largely a question of personal taste.

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The advice of an educated native will probably be the best obtainable. In any case, however, it is invaluable to read a good history of the country, as it provides the foundation on which modern developments are based. In addition, a knowledge of the history of the people opens up innumerable opportunities of conversation and allows one to take a more intelligent interest in the discussion of present day problems. If the student is interested in literature, there are few countries that cannot offer a large selection of good authors. Here again is a useful subject for general conversation, with the further advantage that the reading of good authors has the most direct influence on the attainment of a good style. The student is strongly advised in any case to read a good newspaper every day, in order to keep in touch with modern expressions and current topics.

Finally, it may be said that reading is the only way to acquire a large vocabulary.

9. *Conversation.*

As conversation is the most difficult part of the language, practice should be as frequent as circumstances permit. The student living in the foreign country should endeavour to express himself—even in the most trivial matters—in the foreign language. Neglect to do so may mean eventual ignorance of the simplest expressions and the most apt conversational remarks. It is a mistake to postpone talking in the foreign language until one's speech is believed to be fairly fluent. It can never be both fluent and faultless till one has had the opportunity of committing every conceivable solecism. Mistakes are at any rate instructive and seldom raise so much as a smile from the indulgent foreigner. The greater danger is that mistakes thus made may pass unnoticed by the student and through frequent repetition become a habit.

At first the stimulation of conversation is a real difficulty, which only a good teacher can overcome. The method adopted by the best teachers is to make the student read a passage in the foreign language aloud, and afterwards relate in his own words but in the foreign language, the substance of what he has read. The teacher will then draw out the correct story by skilful questioning, thereby forcing the student to do the maximum of talking.

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This method of reading aloud has the double advantage of allowing the correction of the student's pronunciation, and accustoming him to the sound—always peculiar at first—of his own voice. As the student progresses, the amount of questioning by the teacher rapidly decreases.

Eventually it will be possible to discuss abstract subjects without any reading at all, but unless the teacher is an exceptionally good one, conversation is inclined to assume the form of the student just listening to the teacher. It may, therefore, be necessary for the student to check this tendency. The simplest method of doing so is for the student to arm himself with a subject for discussion prior to every conversation lesson. A few minutes of preparation will suffice to note down the main points, e.g., the plot of a novel or a play, or an event mentioned in the daily newspaper. If drastic measures are needed, one can fall back on such subjects as descriptions of regimental life, incidents witnessed in war or on manœuvres, and other personal experiences.

10. *Revision.*

In the introduction, reference was made to the importance of studying the syllabus. The student is strongly recommended to keep a copy of it at hand and to glance through it from time to time. Failure to do so is like failure to read the question correctly in an examination, and is apt to have the same disastrous results.

Revision is a process which should not be postponed until the near approach of the examination. The "fair copy" exercise book, for example, is practically useless if it is proposed to memorize its contents at the last minute. The most satisfactory method is to allot one day a week solely to revision. On this day the "fair copy" exercise book should be studied with a view to learning the specially marked words and phrases that it contains. The grammar text book should have similar attention, as rules are quickly forgotten, exceptions are generally numerous, and irregular verbs alone in many languages take months to master. Specially noted words and phrases—extracted from books that have been read—as well as technical terms, must be read through frequently before they become definitely impressed on one's memory. In this way, constant reference back to previous work renders revision far less

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onerous—and the matter is much more easily assimilated—than would be the case if it were confined to a short period immediately prior to the examination.

In the last month or two before the examination, a day each week can be spent usefully in working through papers as nearly as possible under examination conditions. The oral examination can be simulated in a conversation lesson, with particular reference to the reading of manuscript, dictating replies and the remaining technical part of the oral examination. These periodical tests will give a fair idea of the progress that is being made, and reveal the weak points in the preparation.

In conclusion, it may be repeated that although the examination is a military one, the only sound foundation on which the military knowledge can be based is a thorough knowledge of the language itself. The preparation for the examination should not therefore be limited to military subjects, particularly at the start. Towards the approach of the examination, more and more attention must needs be devoted to the military side. The student is therefore recommended to interest himself in every subject which will improve his knowledge of the people and of their language and, as the time of the examination draws near, to make constant reference to the syllabus, in order to ensure that no part of it is being overlooked.

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APPENDIX.

Suggested Initial Weekly Programme of Work.

(Referred to in Part III, para. 1.)

Subject.	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.	Remarks.
Translation into the foreign language ...	1	1	1	Revision	1	1	Each piece to be from 20 to 25 lines of printed matter.
Translation into English* ...	–	–	1		–	–	
Letter or Essay ...	–	1	–		1	–	Each composition to occupy about one hour and to be eventually from 600 to 800 words in length.
Extempore Composition...	1	–	1		–	1	Each passage to be of length sufficient to occupy a period of 15-20 minutes.
Extempore Translation*	–	1	–		1	–	
Dictation* ...	–	–	–	1	–	1	This time (15-20 mins.) can eventually be utilized for conversation.
Conversation ...	1	1	1	1	1	–	In periods of 15-20 minutes each during a lesson (not casual conversation).
Reading M.S.S. ...	1	–	1	–	1	–	In periods of 15-20 minutes each. Special attention to be devoted to dictating a reply to each M.S.S.
Oral Translation	–	1	–	1	–	1	In periods of 15-20 minutes. Matter to be selected from British training manuals except once a week from foreign manuals.

* Can usually be corrected by the student himself.

NOTE. This programme necessitates a teacher for about one hour daily including time for the correction of the written work that has been prepared. The student, therefore, would be occupied from two to three hours a day as shown above, thus allowing ample time for copying of corrected work, fairly extensive reading and such other conversational practice as may be obtainable. Students who are unable to devote so much time to the study of the language can observe the same proportional distribution of work.

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THE CLOSE SUPPORT OF TANKS.

By Major C. T. Beckett, M.C., R.A.

THE Close Support of Tanks in the attack is a problem sufficiently modern to warrant some further analysis than it has so far received.

References to the subject in Artillery Training are brief and are themselves of such a nature that the fundamental differences in the treatment of the two phases of the tank attack are by no means clear.

These two phases are, firstly, the assault on the position defended by all arms and secondly, the attack on the rearward enemy defences beyond the support of the mass of artillery.

Preparation for the first of these phases is capable of any degree of perfection which the time, intelligence and weather factors and the general question of ammunition expenditure may permit.

Given time and plenty of ammunition, the enemy artillery plan may be discovered and in due course neutralized. Aeroplane photography will disclose prepared emplacements for anti-tank guns. A preliminary reconnaissance in force may be successful in forcing the disclosure of the fire plan of defence. Suitable weather conditions will permit smoke to be employed, though the blindness of the tank is a serious objection to anything but the most carefully conceived smoke plan operated over such narrow belts of country that direction, maintained at high speed, will not be lost owing to appreciable periods of loss of visibility.

Every factor of success can be reasonably assured in advance by map study, reconnaissance, weight of ammunition and artillery concentration up to the moment when the tanks first disappear from the view of the observation posts, either beyond our own smoke cloud or beyond the ground horizon of the observers.

In the ordinary course of events it is at this juncture, that the tank attack will need the weightiest support and the most accurate control of artillery fire, for it is here that will be encountered the forward elements of the mass of the enemy's artillery and here that

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possibilities of loss of direction are most likely to occur. Counter-battery work blindly carried out will be as much a menace to the tank attack itself as to the enemy engaged. The use of smoke will possibly have created a ground haze which will negative the employment of aeroplane observation. Information will have to reach the supporting artillery at regular intervals of not less than two minutes if support over the last five hundred yards of approach to each objective is to be given economically and lifted promptly as the attack enters the 100 per cent. zone of supporting artillery fire. Aeroplane observers, and the tanks themselves, are travelling too fast and observation is too difficult at reasonable heights for such a rapid succession of reports. At this point tanks may be said to have approached the moment when they are acting independently and when, if Artillery Training is to be believed, mechanized field artillery will move forward to support the further advance.

With the departure of the self-propelled mounting in every form from the field, and the complete absence of armour for any other form of mechanized artillery, there can be little doubt that any movement of attacking artillery in the forward enemy zone until it is occupied by our own infantry is beyond practical consideration.

The weight of the tank itself has already reached its maximum when cost, and speed requirements are considered.

Tank armament is tending to become lighter in calibre rather than heavier, so great a handicap is the weight of weapon and ammunition.

It is therefore inconceivable that a gun of sufficient calibre to engage on equality even enemy field artillery, armoured as adequately as the tank which it is designed to support, carrying a sufficiency of ammunition each round materially heavier than that carried for the tank itself, and endowed with identical if not superior speed, can enter the realms of practical design until an engine and transmission of a radically improved type have been created to carry it.

The support of the tank in the attack then, during its penetration of the zone containing the mass of the enemy artillery offers three alternatives. It must either be left to its own armament and inherent power of manœuvre in an area bristling with hostile weapons

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well adapted for defence with sights and platforms and prepared emplacements; or the counter-battery fire plan must be carefully timed and the risk accepted of annihilating or at the best blinding the assault if synchronization fails; or the means of observation and communication must be improved and made so sure that information as to the progress of the attack will be complete, frequent and instantaneous.

Such a situation can only be achieved by the actual accompaniment of the assault, in sufficient numbers to ensure report along a wide front, of specially designed observation vehicles containing artillery observers and radio-telephony. Observation, communication and protection should be the primary requirements of the vehicle superimposed upon a speed performance slightly exceeding that of the vehicle it is designed to accompany. No question of weapons for defence, no "dual purpose" mutually opposing objectives should obscure these requirements or alter their order of importance. On the numbers necessary, whether from the aspect of the breadth of the tank attack or from the geographical or "wave" distribution of artillery communications, theoretical discussion is at present unprofitable. The circumstances of each case as disclosed by experiment alone will dictate requirements.

Observers must report objectives and the distance of their tanks from those objectives at very frequent intervals. For instance, an 18pdr. battery in support must receive information of the position of a tank travelling at 10 miles an hour at a range of 6500 yards, at least 400 yards ahead of the actual target to enable fire to be withheld before the tank enters the hundred per cent. zone.

It is apparent that at such depths of penetration the possibilities of enfilade will be rare and for support over the last 250 yards fire must either be lengthened, withheld altogether, or heavy risks run. Of the use of smoke more may be said.

Like the wind requirements for the employment of smoke in support of the infantry attack the best direction for the wind is at right angles to the line of attack. Unlike the infantry attack, however, the best alternative is against the direction of advance. The tank should have less difficulty in manœuvring over the ground which it has previously overlooked but which is obscured by a smoke

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cloud moving towards it, than in manœvring over ground beyond its view at the inception of the attack, but across which the smoke cloud may continue to move as a low haze for a considerable distance, accompanying the attack at much the same speed. The tank attack should emerge from successive walls of smoke, put down after opportunity for observation of the intervening country has been obtained, rather than penetrate and fight within a fog over previously unobserved terrain with the risk of overlooking important defended localities. Smoke must be used with caution, if necessary to the detriment of the immobile artillery but to the benefit of the mobile observers and of the tanks themselves.

Such then is the first phase of the tank assault up to the moment when the limit of range puts an end to the effective support of artillery fire, and the slow progress of the infantry precludes the effective forward movement of supporting artillery. With the successful rupture of the zone of the enemy's mass of artillery a fresh situation at once develops. The rally can be accomplished and independent action can commence.

Unless this independent action is going to be spent upon the encounter of natural obstacles, as canals for example, defended at important crossings by carefully sited anti-tank weapons, the survivors of the assault must be prepared to overcome regional organized resistance. The rupture of the front in these days of radio-telephony no longer spells the dislocation of communication, and with the broadcasting of the alarm, all crossings and defiles will be destroyed or blocked except those of an arterial nature. These will be effectively defended. To overcome such resistance and to assist the assault tank to make good such vantage points, some engine of accompaniment is necessary. The conditions governing the requirements of close support have now, in this second phase, fundamentally changed from those which existed before the rupture of the enemy's main defence. The immediate objectives are local and concentrated, the calibre of their defence in all probability low, and the area of such targets as the defensive weapons may offer for attack, very small indeed. On the other hand the opportunities for manœuvre of the attack are less limited, manœuvre can be suited to the wind, and external observation of the support afforded may not be impossible.

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Communication to the main attack ceases to be of vital tactical importance and apart from enemy initiative only one factor limits the scope of the support afforded—the supply and carriage of ammunition The projected close support tanks are armed with a light howitzer of limited range, calibre and weight of projectile. The true weapon is the projectile and not the projector and it is therefore upon the type of projectile that the success of design and tactical employment will depend. In the absence of information as to the ballistics and calibre of the howitzer selected it will not be unfair to discuss the provision of close support on what is possibly the flattering plane of the mean of the performances of the 3·7 inch and 4·5 inch howitzers each employing first charge.

The following range table is evolved :—

1	2	3	4	5	6	7
Time of Flight	50% zone.		Tangent Elevation	Range	% of Direct Hits	% effective on unprotected target[1]
secs.	Length	Breadth				
3.12	10	1	5°17′	500	17	50
6.45	30	1	11°47′	1000	6	16
10.45	50	2	20°28′	1500	2	11
13.45	60	4	26°15′	1800	1	7

Assuming that the total weight of ammunition carried by the close support tank will be no greater than that carried by the medium tank and that no small arm ammunition will be carried, it may be taken that an optimistic estimate of the number of rounds which may be carried will be 50. From this it may be seen that though at 500 yards there will be a prospect of obtaining successfully *from rest* nine direct hits while sixteen other rounds will burst within a lethal radius, at 1,000 yards there will be only three direct hits and five within lethal bursting radius. At 1,500 yards there will be one direct hit and five within lethal radius and at 1,800 yards no direct hits and four within lethal bursting radius. These

[1] The probability of obtaining a direct hit on an anti-tank gun emplacement 6′ × 12′ is shown in column 6. Column 7 presumes the anti-tank gun to be unprotected and any round within a 10 yards square to be effective.

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discouraging figures presume that the *whole* ammunition carrying capacity of the close support tank is filled with high explosive shell and that *all are devoted to fire for effect,* on a *single* target.

It is obvious that these most optimistic presumptions can never be realized partly from the necessity of carrying a mixed complement of ammunition, partly from the necessity of conserving the ammunition supply, and partly from the necessity of ranging systematically at any range over 800 yards. Finally these figures postulate a steady platform, a condition which the tank in motion is far from fulfilling, and the M.P.I on the centre of the target. Once these qualifications are introduced the value of the high explosive becomes more than questionable and is limited to effect upon targets within a range of 500 yards—a range at which the 3 pdr. tank gun and the machine guns require little or no support if neutralization can be otherwise produced.

Having due regard to the economical advantage of smoke shell for such a purpose, the total ammunition capacity and the absence of any appreciable reserve for further supply, the value of high explosive is less than negligible and the value of the close support tank, as a smoke screen producer with no complications, is much enhanced. Let us put on one side "the moral effect of a few rounds of H.E." In such a crisis as will arise if a number of armoured fighting vehicles break through *en masse,* we must anticipate a morale no whit less than our own. The effective resistance of Carey's Force before Amiens and of the German machine gunners on the Scheldt in November, 1918, offers little encouragement to believers in the efficiency of a scattered fusilade such as may be expected from a high-explosive weapon with such a platform. If the ammunition question is confined to the supply of smoke shell every round will have a neutralizing effect, and fire power can be supplied by the armament of the medium tanks advancing upon a completely blinded enemy.

The equipment of close support tanks with some means of communication which would permit of fire from behind cover and with external observation would increase their efficiency materially, and make a steady platform a possibility. It is useless to discuss the proportion of such weapons when the organization of the Tank Battalion is in such a state of flux, but it is worth consideration

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whether such a battery requires artillerymen or Tank Corps personnel to man it. The employment of artillerymen for purely smoke production purposes, when every other argument suggests homogeniety within the Tank Corps, should find little favour. The close support tanks should be battalion or company weapons and part and parcel of their organization.

Such then are the factors which constitute the close support of the tank attack in its two phases. In neither case is there a common denominator with the difficulties of the close support of infantry. There, infinitely variable factors of communication, observation, ammunition supply, range, and accuracy react and interplay.

In the first phase of the tank attack the problem of communications once solved, success should be assured.

In the second phase the absence of communications, the unavoidable paucity of ammunition, and the limitation of efficiency which the absence of ammunition imposes, indicate unhesitatingly the only solution possible under the circumstances. In the close support of the infantry attack the multiplicity of variables encourages discussion and prolongs the delay in coming to a decision as to weapon and organization.

So far as the tank attack is concerned the solutions to the support of both phases are clear; nothing but design is required to set the seal of finality to the tactical problem.

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MUTT WITH HIS BACK TO THE WALL.

By MAJOR A. H. BURNE, D.S.O., R.A.

THE remarks of Jeff in his verbal scrap with Mutt have occasioned no adverse comment in the columns of the R.A. Journal. Poor Mutt, however, has had to take one or two hard knocks and has asked me to try and get the following rejoinder inserted. He has returned to Ruritania, from where he writes as follows:—

Such remarks as "reactionary," "narrow-minded," "stubborn prejudice" leave my withers unwrung. I expected them! Invective is not argument. But some arguments have been put forward on which I should like to comment.

First of all, what was my bone of contention with Jeff? Simply this—I asserted that the High Priests of "Survey-cum-Brigade-concentration" were making unwarrantable claims for their pet child, and that the dear boy was likely, through over much petting, to get swollen-headed and take himself too seriously.

My elder brothers taught me the dire consequences of little boys taking up too much of the stage—and on the training stage (i.e., practice camp) there is only limited space (time and ammunition); the more space taken up by this blue-eyed Joseph the less room there is for his elder brethren. . . I cannot carry the analogy any further or it will break down!

It follows from the above that all arguments based on whittling down the claims made for Joseph, so far from telling against, go to substantiate my case and object! Yet this is precisely what is now being done. *Concentration,* it now appears, does not mean concentration, but dispersion. *Brigade* does not mean four batteries but two batteries, etc.

Having got that off my chest, let us get down to one or two arguments.

Now, the first essential for an argument is that we should have a common premise. Have we got this? I doubt it. In what sort of situation (we must decide) do we propose to apply this Brigade Concentration?

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In the Defence? No—that claim has apparently been abandoned. In advanced guard action? Events will move too fast; and in any case the clash of opposing advanced guards is comparatively unimportant although it is so much practised. It is *the place where the main bodies fight that matters.* The advanced guard should be elastic, and spring back on to a favourable position when the enemy is encountered. The endeavour to fight the battle just where the advanced guard happens to be when serious contact was obtained was responsible more than anything else for the series of French defeats. At the outset of the war—Charleroi, Bertrix, Neufchateau, Rossignol, Virton, Ethe, all tell the same story.

So then our possible situations are reduced to:—

(a) The attack in mobile warfare.

(b) The attack in trench warfare.

As we train for (a) we will consider it alone. In the course of this attack the enemy's troops may be considered under two headings.

(a) Those on ground that is visible to our troops.

(b) Those on ground that is invisible to our troops.

Under what circumstances might a concentration be desirable in these cases?

Case (*A*).

(1) Whilst our troops are temporarily stationary, pending our attack; on to some patch or (to use a longer word) locality, from which they are being worried.

(2) To keep down the hostile fire during the advance and assault.

(3) A fleeting opportunity, e.g., tank attack, cavalry charge.

Case (*B*).

(1) To engage a body of troops massed under cover.

(2) Counter-battery work.

(3) Works or buildings or localities that may be centres of resistance.

If you are all agreed on these six cases, we can proceed to consider the application of brigade concentrations to each of them in turn.

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Case (*A*).

(1) The trouble probably comes from machine guns, each tightly dug in. Is one short burst of fire of any use here? The machine gunner, on the approach of the first shell, makes himself as small as possible. The burst either hits or misses. If it misses him he heaves a sigh of relief when it is over and resumes his fell occupation of killing. Would not a slow observed fire hinder his attentions to our troops more effectively? If I were the machine gunner I know which I should prefer! After all the object of the shoot must be either destructive or neutralising. If destructive, observed fire will do it best—if neutralising, a slow sustained fire will do it best. Concentrations advance neither object.

(2) This will definitely be a case for dispersion of fire. It is too risky to concentrate on one patch whence you *think* the opposition is coming. You can gauge the direction of a gun or shell by its noise, but not a machine gun. Read the Official History on Rue du Bois, May 9th, 1915. There were plenty of artillery observers, but they were powerless to subdue the German machine guns. One Battery Commander in an excellent O.P. confessed that he did not *definitely* locate *one* all day long. And there may be machine guns and rifles that have lain silent till the actual assault. Your brigade concentration will probably miss these. And there is a further risk. You will normally wish to maintain your fire till the attackers are right up to the position. Will you trust a single observer, down a single line of wire, to do this for four batteries? Surely not!

(3) To engage a moving target indirect, with one battery will fully extend the powers of one observer and one line Even the "Hottest of Gospellers," or the "Archest of High Priests" will admit this.

Cases B (1) and B (3) Can be considered together. Survey will not help here. It is the essence, and weakness, of survey that it can only survey what it sees. The target in this case has almost certainly been reported from the air. This can be engaged, from the map, by a brigade crash. But there is nothing new in this. It was frequently done in the war.

(B) (2) Scarcely comes within the province of field artillery.

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So it boils down to this, that suitable occasions for a brigade concentration will be very few. "But," I can hear the enthusiast saying "even if what you say is true it is worth practising. Old Brady, at the Shop, used to drum into his cadets that all the training on the 12pdr. *C.P.* was aimed at a brief half-hour's use in war—we must prepare for everything."—"Shake hands!" says the White Knight, "that's what I've always maintained. We must BE PREPARED. That's why I carry a mousetrap on my horse's quarters. A mouse is not very likely to come that way. But if he does, *I am* prepared."

But the difference is that the mousetrap, once put on the horse's quarters, will (it is to be hoped) stay put; but brigade concentrations must be practised incessantly and assiduously, to the exclusion of much other training that would otherwise occupy the subaltern's time. All of the following may suffer in varying degree:—Miniature range, care of his horses, his men, routine duties, study of his multifarious manuals, mastering of military law, lectures, courses, and—dare I say it?—(small type, please, Mr. Editor) *leave*.

Also every shell used for this purpose means one shell the less available for teaching observed fire. What you gain on the swings you lose on the boats!

Our ideal should be to answer round for round, with cool aimed fire; to hold our fire till we can see the whites of their eyes; every bullet its billet; not a round wasted, etc.

On the other hand, there is something essentially un-English about the idea of these concentrations. I don't mean to say that we should abandon the moral effect of an occasional burst of heavy fire. But if you want a patch plastered a single battery can do it *if you train them to fire rapidly*. By limiting your gun fire to three rounds at a time this cannot be done. In Ruritania we limit it the other way round. Four rounds is the *minimum* allowed instead of three rounds the maximum. We are taught that the 18pdr. can fire 20 rounds per minute, and I have seen one fire 11 rounds in 30 seconds, and a battery fire over 50 rounds of accurately laid fire in the same time. But that was in the war; present-day detachments could not do it.

Much has been made of the advantage of one observation post

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being able to shoot all the other batteries when their own lines are "dis." This is certainly an advantage. I can call to mind at least one occasion during the war when it would have been welcomed. The cavalry were counter-attacking the German counter-attack after Cambrai, supported by a brigade of artillery. At the critical moment one Battery Commander was killed, the lines to one battery went "dis," and only the third battery was able to support the attack. But whether the Battery Commander could have coped with the fire of the other two batteries besides his own is another matter! However, the point is irrelevant, because it depends upon signal communications and is independent of either survey or of brigade communications.

Every action has its reaction. Every stratagem, if carried to excess, contains the seeds of weakness; the lunge of a fencer if too extended and pronounced, may endanger his recovery; every virtue, I had almost said, if practised to the exclusion of all others, becomes a vice.

In the same way, brigade control, if developed and carried too far will sap the initiative of battery and section commanders.

The teachings of the last war should not be forgotten. What was the chief lament towards the end of the war? Lack of initiative. Constant emphasis was laid on this. Here are two extracts from "Notes on recent fighting," dated September 6th, 1918.

"Nothing should be done to hamper the initiative and freedom of Manœuvre of subordinate commanders," and "training must aim at the development of—Initiative of all commanders." Does it still aim at this? Initiative cannot be suddenly acquired on the battlefield. Else Talana Hill might have ended the Boer War. Anyone who was a Battery Commander in either of the retreats, or of the final advance of the last war, will agree that there are times when if a Battery Commander keeps one eye cocked over his shoulder looking back for orders (which may never come) he will lose in the one case his battery, in the other, glorious opportunities.

Finally, the effect of bullets and cold feet on "tan θ" has yet to be put to the test. But anyone who has had to draw up a barrage table at night under fire, for an attack at dawn, will extend his mead of sympathy towards the G.P.O. of the next war.

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VOLUNTARY EDUCATION: AN EXPERIMENT.

By MAJOR F. H. N. DAVIDSON, D.S.O., M.C., R.A.

MANY regimental officers, however keen on their profession, do not seem to realize the great importance of education. This is especially so in the case of pre-war officers who remember the days when education was entirely carried out by the Army Schoolmaster, and therefore entailed no effort from the regimental officer. Further, lack of education did not then seem to decrease the military value of the stolid ill-educated man so commonly found before the war, who was none the less an excellent soldier.

The Post War Attitude Towards Education.

The situation has now changed. To quote from Hansard: "We are developing a more educated type of soldier, a more studious type of soldier and perhaps a better type of soldier." The need for an intelligent soldier, able to think for himself, was most clearly brought out during the Great War, and the advantages of education and educational certificates to the soldier seeking employment on discharge are now acknowledged to be considerable The post-war views of education are thus radically different from those held in 1914. Education is now rightly regarded as a branch of training, and its importance is officially recognized to such an extent that a special rate of educational proficiency pay is awarded to all men who have a second class certificate. It is with the importance of this second class certificate of education that this paper attempts to deal.

The Importance of the Second Class Certificate.

Before going further it will not be out of place to explain why the second class certificate is so important from the point of view of the regimental officer, who is responsible for education up to this standard.

The instruction for first class and special certificates is, for obvious reasons, laid down as the task of the Army Educational Corps personnel. Regimental officers may be able to assist in

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Map Reading and even give certain lectures, but their main rôle is not really to teach but to encourage their N.C.O's and men to work for their "firsts," and to arrange every facility for the candidates to work and to get instruction, leaving the bulk of the teaching to the Army Educational Corps.

The "uncertificated" men also present few difficulties in view of their small numbers, as 3 per cent. to 4 per cent. is the normal percentage of these men (i.e., some 15 to 25 men per Artillery Brigade or Battalion). Many of these are of the old soldier groom or servant type, who will never pass the examination. One class for these men is all that is required, and the organization of so small a class presents little or no difficulty.

The educational training carried on now at depôts should further reduce the numbers of uncertificated recruits to a negligible percentage.

The men who have their "thirds" (and should therefore be working for their "seconds") present, however, a very difficult problem.

Statistics from a large number of formations and units show that 35 per cent. is the average percentage of men with "thirds." If we take the case of a Field Artillery Brigade (horsed) with a peace establishment of roughly 500 all ranks, it will normally have some 175 men with "thirds" (i.e., 35 per cent. of 500).

It must again be pointed out that these "thirds" have a definite right to be given instruction not only in order that they may earn another 3d. per day (or roughly an average of 10 per cent. increase in pay), but also that they may receive that educational development which may be all-important when they leave the Army, both from the point of view of civil employment, and from the standpoint of citizenship as a whole.

Educational Facilities in a Field Brigade R.A.

From now on this article confines itself to the question of instructing men for the 2nd Class Certificate of Education in the case of a Field Brigade, R.A.

The reader is asked to accept, and to keep in mind the important figure of 175 *men with "thirds" per Field Brigade R.A.*, as being a fair average. Clearly, after a successful examination or the

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despatch of a large draft abroad this figure may be as low as 125. On the other hand, on the receipt of a large draft of recruits it may equally be as high as 225. The problem is, therefore, how can some 175 men be given adequate instruction with the limited number of instructors, and without interfering with purely military training? The solution of this problem is clearly more difficult in a mounted unit owing to the heavy demands of stables, etc., on men's time and energy.,

As regards instructors, normally three per Brigade will be all that can be hoped for. Though there should in theory be one instructor per Battery (total four), the calls of the Depôt for N.C.O's, sudden demands for N.C.O's for abroad, losses through discharge, promotion to higher grades of N.C.O's, and the fact that it takes time before a vacancy at the Army School of Education can be allotted, to replace the loss of an instructor, mean that the Brigade will usually have only three qualified Educational instructors at any given moment.

Of these three instructors, one will normally be occupied with the uncertificated. Further, during the leave period (October—December) one instructor will generally be absent on leave, and this of necessity during the most important period for educational instruction. Thus, if two classes each of 25—30 men are held, one from 9 to 11 a.m. and one from 2 to 4 p.m., this will be all that is possible from October to December. Actually, it is believed that in practice only *one* two-hour class per day can be normally held for the following reasons.

(a) 30 per cent. of N.C.O's and men are on leave (this incidentally handicaps the continuity of instruction very seriously, and means that 70 per cent. of the men have to do all "duties").

(b) Drafts for abroad, composed mostly of young soldiers who naturally occupied the humblest positions during the previous summers' training, must be given regular instruction in fairness to the Batteries in India. These men will reach batteries in India in the height of the training season there, and must be ready to take their places at once, either as gunners or drivers, with absolute efficiency. They will need at least two hours' instruction a day (say 9 to 11 a.m.).

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(c) The exercising of the horses requires 25—30 men per battery, or say 20 per cent. of the battery, normally from 9 to 11 a.m. daily.

(d) There are certain brigade classes, such as young signallers (10 per battery possibly), surveyors (2 or 3 per battery) which occupy these men fully during the whole of the working day.

How then can two classes a day be held when the above demands must be made on men's time, quite apart from the hours required for stables, watering and feeding.

Even with the most careful organization of instructors and hours of work, it is unlikely that more than 30—40 men can be given two hours education a day, at any rate during working hours, i.e., from Reveille till the end of evening stables (5 p.m.) By the 1st of January most men will have had furlough, and education will be more easily arranged till section training begins, which will be in February, at any rate in the case of brigades who have to go to Practice Camp early. Thus from February (or March) until the end of the Collective Training Season (end of September) education during working hours must be entirely cut out, except possibly during the interval between the end of Practice Camp and the start of Field Training in co-operation with Infantry Brigades, and Manœuvres. From the above it would seem, at any rate in mounted units, that the most careful organization can hardly hope to produce more than about 35 candidates at each of the three annual 2nd class examinations—three being the normal number per annum laid down in Educational training. The rough total of these candidates would thus appear to be about 100 per annum.

Turn Over.

Before putting forward any solutions to this problem, it should be considered from the view-point of turn over—i.e., *losses* through drafts for abroad, discharges, etc., and *increases* in the form of drafts from the depôt.

The average figures of turn over are of interest and great importance. They are now given, as compiled from the "actuals" of five different Field Brigades chosen at random over a period of two or three years, and can thus be taken as a very fair average for the Field Artillery as a whole.

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(*a*) *Losses.*

(*i*) *Through drafts for abroad.*—9 N.C.O's and 70 men per Field Brigade per annum. Probably almost all the N.C.O's have their "seconds": 35 per cent of the men men (i.e. 24·5) will only have their "thirds." Thus, the losses from the Brigade's total of men with "thirds" will be about 25 per annum.

(*ii*) *Through Discharges, Transfers to Reserve, Men on Pension, etc.*

Average 60 N.C.O's and men per annum. Since many of these will be N.C.O's or old or fairly old soldiers the percentage of men with only "thirds" will certainly be less than 35 per cent, and 25 per cent. (or 15 N.C.O's and men) is hazarded as being a probable percentage.

The total annual losses in men with "thirds" will thus be about 40 (25 plus 15).

(*b*) *Increases.*

On an average 135 recruits are posted annually to a Field Brigade, and 90 per cent. will only have their "thirds" when they join, thus making the total increases about 120 "thirds" in 12 months. This figure of 90 per cent. is based on the "actuals" of over 4,000 recruits.

The difference between the increases (120) and losses (40) (i.e., 80) is the number of extra men with "thirds" who will join the Brigade in 12 months.

Since the Brigade at any given moment has theoretically 175 "thirds" on its books, the total *additions* to "thirds" received in a Brigade (i.e. 80) must roughly equal the total *losses* in "thirds" due to men gaining "seconds." This figure of 80 "seconds" tallies with the previous estimate of 100 candidates per Field Brigade per annum, 80 per cent. of which pass the examination, though possibly this is a high estimate. It is for consideration if 80 "seconds" per annum is sufficient in view of the fact that:—

(a) Recruits from the depot (most of whom have actually got their "thirds") spend nearly a year with a battery before

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they are eligible for abroad, in view of their age and/or service.

(b) Nearly 300 men (175 plus 120) with "thirds" are on the strength of the Brigade for part, or whole of the year.

(c) The period required normally to prepare for the 2nd Class Examination is only about 12 weeks, or say a quarter of a year.

The conclusion reached is that from a "turn-over" point of view the supply of educational instruction definitely falls short of the demand, if given solely in working hours. Further it would seem that with 80 "seconds" per annum and an average of 175 men with "thirds" at any moment, the latter may in the extreme case have to wait two years before their turn for education comes. Obviously this is an exaggeration, since many men (probably 40 per cent.) are so backward in ability that the 3rd Class examination will be the limit of their powers, and such men will therefore not be chosen to work for their "seconds," if more gifted candidates are available. It is, however, probably true that many suitable candidates for "seconds" now have to wait 6—12 months before their turn comes.

Note: In the above figures of "losses" and "increases" no account has been taken of postings of senior N.C.O's (e.g., B.Q.M.S.: B.S.M.) to or from units, or of postings of N.C.O's to and from the Depôt, as these postings will, on an average, cancel out. In any case these N.C.O's will be normally in possession of their "seconds" and thus do not affect the present issue.

An Experiment.

The following experiment was tried in a battery from March, 1930, onwards, when section or battery training was in progress, in order to give increased facilities for education, without affecting purely military training. At that moment there were in the battery, some 40 men with "thirds." Section training and stables kept the men busy from reveille till 5 p.m. An attempt was therefore made to see if any men with "thirds" would volunteer for an "out of hours" course.

The conditions laid down beforehand were:—

(i) Work hours 5.15 to 7 p.m. on Mondays, Tuesdays, Thursdays, and Fridays, and on Sundays after church (men thus got their half-holidays free.)

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(ii) All volunteers would do their guards and picquets on Wednesdays, Saturdays, or Sundays (this made for continuity of instruction).

(iii) Once a man volunteered, his attendance became compulsory, and he was "fallen in" for education, as for parade *Roughly 20 men volunteered for this course.*

Some scheme by which the instructors are suitably recompensed is called for, as they must give up much of their spare time. Extra duty pay, as now issued to Battery Riding Instructors, would meet the case. Alternatively N.C.O's engaged in voluntary instruction might be struck off guards and picquets, or other duties.

In the present case the question of instructors was a real worry as there were none in the battery. One N.C.O. was, however, due back from a Shorncliffe course in three weeks, and he would then have four weeks before the next examination, which was to take place seven weeks from the start of the scheme. In the mean time officers and N.C.O's did their best, especially in subjects like map-reading, English, standard author, etc.

In due course the examination was held and later we learnt the worst. Only two men had passed, though eight others had failed in but one subject. The time available (seven weeks) had been too short. The instruction had obviously been amateur; mathematics had been the main cause of failure. The education authorities were most sympathetic and now helped nobly by a few hours special instruction and some test papers in mathematics. It so happened that a special "interim" examination was to be held about six weeks later (June 5th.) The candidates were now given a few hours per week in work hours, as well as the normal voluntary hours, and a further nine passed the next examination, while six only failed in one subject. Thus in three months with indifferent resources some 11 men (or nearly 10 per cent. of the battery) had gained their "seconds" by "voluntary" education, and this during the height of the training season. Six men were also well on their way to passing the examination. Had all these men waited until after practice camp to join "compulsory" classes they would have had to wait until the 28th September before they could sit for an examination. The two voluntary candidates who passed in April thus earned nearly £2 extra pay, and the remaining nine who passed in June nearly £1 10s. extra.

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Conclusion.

The object of this article is, however, not to dilate upon a certain measure of success gained by voluntary methods, but to draw attention to the possibilities of these methods as a means of solving this most difficult problem of providing adequate facilities for those desirous of passing the important 2nd Class Examination.

The value of this certificate, from a financial, educational and "civil employment" point of view, has been already stressed, and in this connection it should be noted that the reward for military and educational proficiency pay is identical in value—viz., 3d. per diem. Nevertheless, it has been shown that the large numbers of "thirds" and the heavy "turnover" in home units cannot be adequately dealt with—at any rate in mounted units—by the normal available educational N.C.O's, working solely during working hours, unless purely military training is very seriously interfered with.

At the same time the results of this "voluntary" experiment show that actually over 40 per cent. of all the "thirds" in one unit volunteered to work out of hours and that within three months 60 per cent. of the volunteers had passed the examination, and a further 30 per cent. had passed in all but one subject—and this with inexperienced instructors and during section and battery training.

It seems reasonable to assume that this, or other voluntary systems, would meet with equal success in other units, especially if organized by a R.A. Brigade with all its educational resources. It has been pointed out that men have the right to be instructed, and, as the policy is that instruction for the 2nd class examinaion should be continuous, if military requirements at any time prevent the necessary instruction during working hours, a voluntary system seems the only solution.

Finally, the quotation "To him that hath shall be given" will certainly apply to the unit which manages to reduce its percentage of "thirds" from the present average of 35 per cent. down to 30 per cent. or even 25 per cent., since the reduction in numbers of "thirds" will facilitate the instruction of the fewer remaining candidates. If, for example, we assume there are normally in a field Brigade about 60 "thirds" whose educational capacity is too low to enable them even to gain the 2nd class certificate, then with 175

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"thirds" (35 per cent.) there will remain the large number of 115 men (175—60) fit for instruction. With 25 per cent. of "thirds" (or 125 men), this number of possible candidates will be reduced to 65 (125—60), and by concentrating on these 65 men a higher percentage of passes should result.

Although the major portion of this article has confined itself to an Artillery Brigade, by changing the "statistics" of numbers (but not of percentages) it will apply equally to any arm of the service, as the basic figure is that 35 per cent. of all men throughout the Army have their "thirds."

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TIME FUZES.

By Major O. F. G. Hogg, R.A., *p.a.c.*, F.R.S.A., F.R.G.S.,
C.I.Mech.E., M.I.E.I.

THE question of suitable fuze production has ever loomed largely on the artilleryman's horizon since he first awoke to the fact that shell conferred greater power upon his arm than round shot, and the problem then set has not only been steeped in difficulty but its solution has tended to lag behind those underlying the development of other contemporary forms of ammunition and armament. The shell was recognized as a latent factor in war as early as the 14th and 15th centuries, but the absence of a fuze worthy of the name prevented that projectile from becoming a potent argument in the Middle Ages. This lag has been, and still is, apparent during the modern era of artillery, since it seems to be a *sine quâ non* that the ballistical progress reached in any age keeps just ahead of the requisite accuracy in fuze control.

Modern warfare has introduced tactical methods of artillery employment which depend largely on the meticulous accuracy inherent in the up-to-date field-piece. Such devices as barrages covering the advance of troops or denying the occupation of certain areas, curtains of fire which can be lifted at will or advanced at a pre-determined rate, and screens of smoke are only rendered operative by the skill and finish employed in the design and manufacture of present day guns and projectiles. Improvements in this respect and tasks calling for more precise limits can without doubt be expected in the future, which will, in turn, demand greater care and research into the possibilities of evolving still more accurate fuzes.

The birth of the aeroplane, tending—possibly unduly in the minds of some—to shift the centre of national armed effort from the ground to the air, has, owing to anti-aircraft armament, thrown the problem of the time fuze into even greater relief. In bygone days when powder was the universal propellant, muzzle velocities were low and ranges comparatively short, consequently the upper air was seldom troubled by the passage of shell; we were therefore hardly concerned with the eccentricities of combustion caused by high

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altitudes. Now, however, the scene has changed and the stage has been set with other properties. Modern slow-burning propellants and recent gun design have increased the range at which bombardment may take place, tactical considerations may and do call for ranges uncontemplated twenty years ago, and thus the average shell during flight now passes through higher aerial strata than those fired during the 19th century. In the case of counter-aeroplane work this is exemplified to an unusual degree. Finally a greater mobility and fluidity of fire is demanded, necessitating an ever better accuracy of burst if the plans of a commander are to mature satisfactorily.

These two factors, the longer time of burning owing to greater range and the effect of high altitude on the combustion of the fuze powder, have always been the stumbling block to designers, and this difficulty tends to increase, but before reviewing the points with which we have to deal, let us take a brief survey of the past and see how our ancestors contrived to grapple with the problem.

Sebastian Hälle first put forward the idea of regulating the burning of fuzes in 1596. He was, however, regarded as a visionary by all and sundry, and no practical notice was taken of his suggestion till 1682, nearly a century later. The efficiency of a time fuze can only be guaranteed by an accurate method of measuring time, and, therefore, the absence of reliable time recorders previous to the invention of the watch in 1674 did not conduce to much scientific attainment in this respect. Only subsequently to this great human achievement could progress in experience and knowledge become possible. By the middle of the 18th century fuzes were made of beechwood, bored out and filled with powder, and cut to length according to the requisite time of burning. Bitter experience taught that there was, in practice, a limit below which it was not safe to cut the fuze; either a blind or a premature resulted. Therefore, for short ranges some other method of fuzing had to be devised, and in 1779 special fuzes filled with rapidly burning composition were adopted for this purpose.

Time fuzes never really developed to an appreciable extent during the next eighty years, although, on the recommendation of General Miller, fuzes constructed of metal in place of wood were supplied to the Navy in 1829. The art of controlling shell-bursts thus remained in a very primitive state until the repeated failure

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of shrapnel shell at practice eventually brought affairs to a head. Committees sat and pondered, and finally in 1855 Colonel Boxer, after a series of trials extending over six years, introduced his final form of wooden time fuze for S.B. guns. This was somewhat similar to the original wooden fuze, though it was naturally more carefully and accurately made. It had holes bored every tenth of an inch through the side into the composition, plugged with rifled powder, and on preparation for action the requisite hole was bored by a hook-borer. Later on followed the Armstrong A, F, and E, Mark III fuzes, the latter being the prototype of the modern time fuze. The first combined fuze to be adopted in this country was a "Time and Concussion," introduced on the 12th December, 1881, by Sir William Armstrong. During the subsequent classification of fuzes it became No. 52, and was the forerunner of the later T. and P. fuzes. Irregularity in burning was still the great fence at which the manufacturer stumbled, but it was hoped that the obstacle had been cleared when "Fuze, T. and P., Short" took the field, and that henceforth the gunner would have a fuze which could be depended upon to give reliable results. To some extent that hope was justified.

Justification, however, implied no slackening of effort, for the introduction of B.L. guns at this period was giving higher M.Vs and longer ranges. Again the lag was felt, possibly more sharply than before, as a time fuze capable of acting satisfactorily at these longer ranges had yet to be evolved. It was realized that a filling of slow-burning mixtures would merely court disaster, as such compositions were known to be far more irregular in their habits than a quick powder. The difficulty which presented itself, therefore, was that of lengthening the time of burning without at the same time introducing further causes of irregularity. Only two alternatives appeared feasible, to increase the effective diameter of the ring or to employ a second ring. This last arrangement had been tried previously without success by Sir William Armstrong and so the former suggestion—that of enlarging the ring—was adopted, and Fuze T. and P. No. 24 was introduced in 1887. It was not until 1901 that Fuze T. and P. No. 58, the first to be built up on the double-banked system, became an article of Service equipment. It constituted a definite attainment in fuze development and went a

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long way towards solving the problem of long range shrapnel fire as it existed at the close of the 19th century.

The last distinctive step in composition time fuze design was taken in 1905, when the original No. 80 type, based on a design prepared by Krupps, was introduced. This fuze, for use with the Q.F. 13 and 18 pounder equipments, may be regarded as the high-water of evolutionary effort, since all subsequent modifications savoured of degree and not of kind.

The essential qualities of a time mechanism are two in number :—

(a) It should be capable of withstanding rough usage without becoming dangerous; and

(b) It should be able to arm and fire the detonator at low orders of acceleration.

Bearing these essentials in mind let us explore the existing dynamical factors upon which the designer may construct his mechanism. Again there are only two worthy of note and thus his choice of action is somewhat limited. They are :—

(1). The rapid acceleration of the projectile in the bore after firing.

(2). The rotation of the projectile.

By the utilization of (1) he may carry out his purpose in approximately three ways :—

(i). By a shearing wire.

(ii). By a stirrup spring.

(iii). By a spiral spring.

The first method is practically obsolete in our Service, having been employed in the older types, but it may still be encountered in Fuze T. and P. No. 65 A. Its drawbacks are that, firstly, a safety pin must be used as a guarantee against accidental ignition of the detonator due to rough usage; and, secondly, it allows little scope for rendering the type more sensitive should a course be deemed desirable.

The second method is met with in the No. 80 Fuze. No safety pin is necessary provided high accelerations are available, as the detonator can be placed at some distance from the needle and the stirrup-spring made fairly strong. Its drawback is that the effects

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of successive jars, which the fuze may receive during transit, tend to become cumulative and might in the long run cause it to arm.

When firing a round of 18 pounder shrapnel the acceleration of the projectile in the bore of the gun causes the time pellet in this fuze to set back, owing to its inertia, and overcome the stirrup spring carrying the detonator on to the needle. The flash then ignites the composition in the upper time ring.

The last method is found in the No. 83 Mark III Fuze. It does not suffer from the objections referred to above, and, unless made exceedingly sensitive, does not require a safety pin owing to the long distance between the detonator and the needle. The action is also quite simple. On acceleration down the bore the pellet in the fuze sets back and, overcoming the coiled spring carries the detonator on to the needle.

The second dynamical factor is only used when designing a fuze for a low velocity howitzer. In such a case, the acceleration of the projectile being small, the force engendered by compounding the mass of the moving part with it may be of such a low order as to call for so weak a design of stirrup or spiral spring that the fuze becomes unsafe for transport. Or, again, if the pellet be held in position by a shearing wire, that wire would have to be so reduced in diameter as to render the shell carrying the fuze dangerous to load after the removal of the safety pin. Under these circumstances, lighting pellets may be actuated to fly outwards on to needles under the influence of the centrifugal force set up by the rotating projectile; a method employed in the old Fuze, time, sensitive, middle.

The design of a time fuze, in regard to its actuating mechanical devices, presents therefore little difficulty, but the question of an increased time of burning calls for more thought. It has not been easy to produce a fuze which will burn accurately for more than a minute. There is a choice of two alternatives if the length of burning is to be extended appreciably, either to fill the ring with a slow burning composition or to augment the effective length of the train. The latter can be accomplished by increasing the size of the rings or by adding to their number.

Thus there are only two ways out of the impasse:—

(1). To use a slow burning composition.

(2). To use two or more rings.

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These systems, both individually and combined, are in vogue. The slow burning composition may be either a true gun powder or some other combustible material. Gun powders become slower in their action by utilizing charcoals made from hard woods charred at high temperatures, lighter woods calcined at lower temperatures forming the faster burning powders. By a suitable blend, intermediate rates between the high and the low limits of burning speed may be obtained. There are seven types of fuze powders proper employed in the Land Service, their rates of burning varying between 22 and 42 seconds for a standard length of fuze time.

The only other type of slow burning composition which has been approved is known as R.D. 202. It consists of 77 per cent. ammonium perchlorate, 20 per cent. charcoal and 3 per cent. starch, and has the added advantage of being slagless on combustion. It is not, however, entirely satisfactory owing to the difficulty attending its ignition.

Fuzes now have two rings as a general rule, although three rings are found in some approved designs, and even four in certain experimental types. With the ordinary fuze the top ring is usually fixed and the lower one made capable of rotation in order to vary the time of burst for different ranges. With a three-ringed fuze the top and middle rings are generally stationary unless the type be fitted with a bridle when the top and bottom rings move together, leaving the centre ring fixed to the body.

Having obtained a satisfactory design of fuze its performance depends on its filling. In other words, the burning properties of the composition separate "the sheep from the goats" in fuzes, and once the ignition of the time ring has commenced the problem shifts from the mechanical to the physical and chemical plane. The inherent difficulties of successful manufacture are thus seen to be a burden for the chemist rather than for the engineer. For this reason fuzes are not always filled by their makers, and the filler is adjudged the more important personage when the question of performance is under consideration.

In fact, fuzes are almost analogous to wine maturing in bottles, The body, like the bottle, is unimportant provided it is made and sealed correctly, and interests the artilleryman no more than the magnum does the merchant. Fuzes, like wines, depend :—

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(1) On their initial filling, i.e., on their vintner.
(2) On their date of filling, i.e., on their vintage date.
(3) On their subsequent storage, i.e., on their cellarage.

And just as some bottle classified as "Dows 1887 Port" may fail to bring satisfaction to the taster's palate, so may a fuze labelled "No. 80, Mark XI" occasionally disappoint the heart of the firer.

The analogy breaks down in one respect only. Fuzes do not, like wine, improve with keeping; after a short time they tend to deteriorate even when stored under ideal conditions, and this deterioration, unlike that of wine which only offends the palate of the connoisseur, is dangerous to the lives of the men we shoot over.

It is necessary to bring these facts to light in order to show that, although a particular lot of fuzes may be passed into the service as a very reliable batch, having given excellent results at initial proof, subsequent treatment and storage may so adversely affect them that when ultimately called upon to justify their existence they may fail lamentably.

New fuzes are, broadly speaking, subjected to two classes of proof; rest and gun proof. In the former certain fuzes are selected from the lot undergoing inspection and are fired at rest to determine their corrected mean time of burning (C.M.T.), which should be within the specification limits of the ideal figure. In the latter, others are fired from a gun, the equipment of which they normally form part. Gun proof is the more realistic of the two, as there, the burning of the fuzes is subjected to all the atmospheric changes and rotational disturbance which normally fall to their lot on Service. In this case, their mean difference (m.d.) and greatest difference (g.d.) are sought as follows:—

A given number of fuzes are fired at a given setting and their times to burst are recorded. The mean time of burst is then calculated and thus the individual variations from the mean. The sum of these variations divided by the total number of rounds gives what is known as the mean difference. The greatest difference is the time between the longest and shortest bursts.

Now these two figures should bear some mathematical relationship to one another, although such has not always been the practice in the past. We may compare this method of proving fuzes with the firing of a series of plugged projectiles. The m.d. then becomes

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the mean error of each round from the M.P.I., which is equivalent to the mean time of burst, and the g.d. typifies the distance between the longest and shortest rounds. This distance in a series containing an infinite number of rounds is the 100 per cent. Length Zone. Now we also know that the mean error multiplied by 1·69 gives us the 50 per cent. Length Zone, which is a quarter of the 100 per cent. Zone. Therefore, in order to arrive at compatible figures for our gun proof, the g.d. should be 6.76 times the m.d. for an infinite series. As, however, it is clear that a series containing at most 20 rounds could not be expected to give the true 100 per cent. Zone, the factor 6 may be taken as an average figure, which works out approximately to a 98 per cent. Zone. If it should be desired to tighten up the performance of the fuzes further, a third proviso, legislating for a greatest difference from the mean, could be instituted. This would tend still more to group the bursts.

These three criteria, however, the C.M.T., the m.d., and the g.d. are considered to stamp, as far as is possible with a limited proof which by its very nature is a gamble, any given lot of fuzes as good, bad, or indifferent, and to ensure that only good fuzes should be accepted for the Service. The qualifications called for by A.A. and ordinary fuzes are not quite similar. In the former, closeness of grouping with the majority is more important than an average level of excellence, and a round bursting well short in such a series does not detract from its usefulness, whereas with the latter, such a round over a land range might, if close limits were being observed, cause considerable havoc. Thus in the original proof of A.A. fuzes, the presence of one "sport" has not the same importance as it would in an ordinary T. and P. fuze proof.

When fuzes are passed into the Service, however, the questions of age and storage conditions arise and these may, and often do, adversely affect fuzes originally accounted of good repute. Age in fuzes increases the time of burning apart from any climatic condition since moisture, which cannot be eliminated, is absorbed and retained. On the other hand an old powder will burn quicker than one recently blended and therefore fuzes filled with powder which has been long kept in store will be quicker in their effect than similar fuzes filled with freshly prepared composition. In order to counteract this tendency fuzes filled with powder from old

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stock are made to burn to a standard, and in practice all blending is so effected as to obtain the required time of burning immediately before use. A fuze, therefore, which has been stored for some time may be expected to function at a slower rate than the normal.

Dampness is really the deteminant in storage. Firstly, it increases the time of burning apart from any other consideration, and, secondly, it tends to deteriorate fuzes especially in hot moist climates abroad. The injury sustained from exposure to moisture is permanent and increases with time, although the original contributory cause may have been with drawn. Detonators become infected whereby blinds or unsatisfactory bursts may result. Bad cases of damp infection not only lengthen the time of burning but may prevent ignition, or even, in extreme cases, lead to premature action. For instance, the composition may swell, the resultant expansion forces away the cap, so that on drying the tension between the rings slackens, especially if the box-cloth washers have perished. This leads to "flash-overs" and premature functioning. Corrosion of the body, and rusting of the steel parts, such as needles—also lead to a very unsatisfactory state of affairs.

Of course, fuzes in the Service are subjected periodically to proof and examination, but such proof can only be taken at rest and the resulting C.M.T. calculated. It would naturally be a better index of possible deterioration were a gun proof possible from time to time. The cost involved, however, would render such a proceeding out of the question.

Possible climatic interference in storage is neutralized to a large extent by packing fuzes in hermetically sealed cylinders, but should moisture in any form be enclosed at the same time deterioration is accelerated. For this reason the modern tendency is to abolish all forms of absorbent packing material, and to design packages capable of holding their contents firmly by other means. Substances such as cork or flannel are now known to be a frequent source of trouble, especially in soldered tins.

All these considerations show under what great disadvantages the average fuze has to labour. But assuming that a fuze is sound on firing, let us study the effect of physical conditions upon its burning properties. Three factors come into play.—

(1). The rotational velocity or the spin of the fuze.

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(2). The effect of pressure on the burning face.

(3). The effect of the temperature of the composition.

These factors have little effect when shell are fired with low trajectories over short or medium ranges, but when high angle or long range fire is undertaken the effects engendered become very marked and of extreme importance to the subsequent accuracy of bursts. The higher the trajectory or the longer the range the greater the inaccuracies become, and blinds are not infrequent. These physical effects are largely inter-dependent; for instance, the effect of spin, which at sea level is negligible at speeds below 12,000 r.p.m., would become quite noticeable at an altitude of 15,000 feet owing to the diminution of pressure. However, for all practical purposes, if the gun be shooting normally, the errors due to these three factors may be assumed to be cumulative and the resultant effect calculated as the sum of the effects of each cause taken independently without reference to the others. Therefore, a constant percentage correction, which will give fairly accurate results, can be calculated and applied.

The effects of spin, which are two-fold, are due to centrifugal action set up by the rotating shell. They are:—

(a). Mechanical disintegration of the powder at the burning face.

(b). The choking of the ring vents by slag.

When the rotational velocity is high, that portion of the composition warmed, softened and just ignited by the combustion of the previous layer is thrown towards the outer edge of the grove in the time-ring before it has had time to burn properly and set fire to the next layer. Combustion, therefore, slows down and becomes irregular. This effect is not noticeable with ordinary gunpowder with a low rate of spin; but since centrifugal force is directly proportional to the square of the angular velocity the effects increase very rapidly at high rates of revolution, and once the figure of 30,000 r.p.m. is reached burning becomes quite unreliable in the case of the ordinary fuze, and may fail altogether. The sulphur content seems to bear directly on this phenomenon and its percentage figure is now never allowed to exceed ten.

Slag, or the products of combustion, tend to block up the ring vents under the action of a high rate of spin. This causes an in-

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crease of pressure inside the ring as the liberated gases cannot escape with their accustomed freedom. This pressure increases until the observation is blown away, when the cycle recommences. This succession of small explosions accompanied by pulsations of pressure are equivalent to a total reduction of pressure on the burning surface with a consequent slowing down in the rate of combustion.

The effects of pressure may be considered under two heads:—

(a). The static pressure of the atmosphere in which the fuze is burnt.

(b). The dynamic pressure due to the motion of the shell through the air.

Any increase of pressure on the burning face increases the rate of burning and consequently decreases the time taken for complete combustion. Therefore the higher altitude, the less the static pressure and the greater the time of burning, or at sea level a drop in the barometer will have the same effect. R.A.O.S., Part II, Pamphlet No. 5 gives a table showing the increases in the times of burning fuzes for a diminution of atmospheric pressure of 1 inch of the barometer from the normal height of 30 inches.

The dynamic pressure is a maximum at the nose of the fuze as the extreme tip of the projectile bears the brunt of forcing its way through the air. Experiments have been carried out to show that a cylindrical body having a thin needle projecting in prolongation of its major axis gives as good a figure for "K" as a pointed one having a similar coefficient for shape of head. The curved portions of an ordinary shell, therefore, experience little pressure during flight; in fact the latter falls off to below one atmosphere before the cylindrical portion of the body is reached. The pressure varies with the velocity but the general shape of the pressure curve remains constant. At velocities below 800 f.s. the pressure on the nose is small, but after the velocity of sound has been reached it increases rapidly, and the region of positive pressure is extended further back from the nose.

Therefore, for any given fuze and shell, the higher the velocity the greater will be the pressure exerted on the vents. Also such pressure will be intensified when the fuze is fitted to a large shell instead of to a small one, conditions of spin, etc., being the same,

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since the escape hole will be relatively further forward compared to the shoulder. The contour of the fuze affects the shape of the pressure curve and should run smoothly into the lines of the shell to give a more regular and gradual decline of pressure. Any projecting portion in front of an escape hole is to be avoided, producing as it does a partial vacuum in its immediate rear with a corresponding region of diminished pressure.

Temperature effects may be considered under three headings.

(a). The initial temperature of the fuze.

(b). The gain of heat by conduction through the body of the fuze from other parts of the composition already under ignition.

(c). The loss or gain of heat by contact with the enveloping air.

Any increase in temperature increases the rate of burning and so decreases the time of burning. Considering these headings,

(a). The variations between the initial temperatures of fuzes are of small account.

(b). The gain of heat by conduction is only noticeable when a fuze is burnt at rest. During flight this gain is negligible owing to the cooling effects of the air.

(c). Loss or gain of heat will occur when the fuze comes into contact with the external air and is due to three causes.

(i). Initial difference in temperature between the fuze and the surrounding medium.

(ii). Fall of atmospheric temperature at increasing altitudes.

Between sea-level and an altitude of 10,000 feet the normal drop of temperature is almost constant and only measures 20 degs. F. Between 10,000 and 20,000 feet the decline is more pronounced, and the rate of change rapidly increases at higher altitudes. Thus at 30,000 feet above M.S.L. the normal temperature at half-saturation is—31·2 degs. F., or over 60 degs. of frost.

For high-angle fire therefore this effect is of importance.

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(iii). The effect of the rapid motion in compressing the air round the head. The compression is rapid and the work done produces a rise of temperature.

Having now reviewed all the factors which affect the time of burning and the consequent reliability of fuzes, we can see that only those due to age and storage really perplexed the workers of other centuries.

But accepting the challenge thrown down by the requirements of present and future shooting, the problem assumes almost insuperable difficulties if strict accuracy is to be demanded. For this reason man has turned his inventive faculties into another direction and the mechanical fuze has emerged as the result.

A mechanical fuze is one in which the time to burst is controlled by mechanical means in the place of the burning away of a train of composition. It may depend for its action on time or distance although no mechanical distance fuzes have yet been approved for the Service.

The advantage a mechanical fuze offers is the abolition of most, if not all, of the difficulties inherent in the combustion type. Physical and chemical factors disturb them not, age and climate almost pass them by. The mechanical time fuze, however, has one outstanding merit; each individual fuze may be tested periodically for accurate time keeping without in the least destroying its usefulness. This is practically proof without destruction.

The disadvantages of mechanical fuzes are:—

(1). Their present high cost of manufacture.

(2). Their possible loss of spring tension during storage. This is a point upon which a definite opinion cannot yet be pronounced. The Germans claimed to have experienced no loss of tension after ten years, and their mechanical time fuzes are certainly extraordinarily good. Should it be found that the clockwork develops a tendency towards unreliability after long storage, especially in bad climates, they may perhaps prove no better in the long run than the combustion type.

(3). A high rate of spin affects their mechanism to a certain extent.

(4). They may possibly suffer deformation in high velocity

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guns, but again no verdict can be definitely pronounced.

As the time to burst, after the fuze has been armed, is practically independent of the spin except at very high rates, the design can be used with nearly all equipments provided the time of flight be known, even though the range-table does not include a scale for the actual fuze. This is the great advantage of having the setting a linear function of the time.

There have been six mechanical time fuzes approved up-to-date though none have yet been issued for Service. These are Nos. 200, 201, 202, 203, 204, and 205. No. 200 was the original and No. 203 is the improved Land-Service pattern.

The mechanism of No. 201 is identical with that of No. 200 except that its range is 85 instead of 60 seconds. So far none have been made.

No. 202 is the Naval design and is similar to No. 203. No. 204 consists of the No. 200 mechanism made in France, fitted with a safety catch to bodies pertaining to the No. 203 design.

No. 205 is our nomenclature for "Fuze, time, mechanical, German, converted, Dopp. Z.16," the fuze from which No. 200 was developed. A certain number of these mechanisms have been handed over by Germany.

The essence of the mechanical time fuze is its main spring, and unless that component is correctly made and tempered trouble and inaccuracy will result. Now such springs are not easy to turn out, and it is their mass production in war which will constitute the "nut" to be cracked before the supremacy of the fuzes can be established. Experience, only, can show whether the watch and spring makers of this country are capable of rising efficiently to their task while labouring under such an undue strain.

The problem, as originally stated, still looms large upon the horizon and the evolution of science has only opened up further vistas of rock and crag undreamed of by the gunner of old. These must be faced with resolution, energy and perseverance if the technical side of artillery is to keep pace with its tactical employment. *Ultima ratio regum* may or may not be a fact in these days of chemical warfare, but the potency of that argument depends finally on the efficiency of technique.

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THE TECHNICAL TRAINING OF A TERRITORIAL BATTERY.

By Major D. J. Gordon-Dickson, 339th (Essex R.H.A.) Field Battery R.A. (T.A.).

IN the "Army Quarterly" issue of March, 1930 an article appeared dealing with the subject of the attachment of P.S.I's to Territorial units. While much may be said for the attitude of those in authority, a strong case can be, and was, made out for a longer period of duty than that at present allowed. A point, however, which was not discussed, was the precise role that the P.S.I. should play in the training of the unit. In this, as in most things, there are two schools of thought. The first holds that the P.S.I's primary duty is to instruct, and, in practice, the entire training of the unit is entrusted to him during the time that the unit is not in camp. While it is agreed that the P.S.I. is probably more *au fait* with the latest developments and has a greater technical knowledge than any of the Territorial personnel, the writer holds that the system of training is bad, and that the P.S.I. should not act as the sole instructor of the unit.

As far as an Artillery unit is concerned, the P.S.I. should act in a dual capacity, that of clerk and "court of appeal." A battery, especially when detached from Brigade Headquarters, has far more office work than a corresponding unit of other arms. The B.C. deals direct with his Territorial Army Association as regards the administration of his drill hall, the supply of clothing, the hire of horses, the payment of travelling allowances, etc., with Ordnance regarding the supply of ordnance stores, the carrying out of lists of changes and the repairing of damaged materiel, in addition to corresponding through the usual channels regarding training matters. If the B.C. lives at some distance from his unit and is only able to go down once or twice a week, the accumulation of correspondence is considerable, and when the P.S.I. has been on leave, has on occasions occupied 2½ hours of the evening, thereby preventing the B.C's attendance at drill. A P.S.I. trained in office

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work with normal intelligence can reduce this period to a minimum. Routine matters and letters the answers to which are obvious, can be typed out ready for the B.C's signature. Correspondence which requires reference to earlier files can be laid out ready, and the whole "office" can be disposed of in 40 minutes at the outside. This is, however, only possible where the P.S.I. has done office work previously, and it has been the writer's experience that where this has not been the case the training of the unit has suffered accordingly.

Now as to the "court of appeal." It is the writer's contention that unless a Territorial officer or N.C.O. is capable of instructing his men he is not fit to hold the position which he does. The only method of discovering and inculcating that fitness is by compelling Section Commanders and Nos. 1 to give instruction and to insure that that instruction is accurate. The P.S.I. therefore becomes a "court of appeal" on finer drill points and, under the B.C., during parades holds a watching brief to correct errors which have not been spotted by the instructors. It it with these two themes that this article deals.

The chief problem in devising any training programme which is to be progressive, is to ensure that the men attend the parades especially arranged. In a unit which draws its recruits from a town and the surrounding district, the occupations of its members are so diverse that their hours of work are never the same. In consequence, while in the winter months the bus and chara-a-banc drivers and agricultural labourers are probably available for most evening drills; especially near Christmas, the shop assistants and errand boys are not, while in the summer the reverse is the case. A progressive programme of training is therefore difficult to draw up, a fact which is not always appreciated by the training authorities. Again with drill halls in a town, no parade ground, and no transport, the technical tests and training of layers, of assistants and range takers, is well nigh impossible, so that ways and means must be devised to overcome these difficulties. The battery staff provides further problems. Signallers, as has been said in practically every Part II. Practice Report since 1920, have to do at least three times the number of drills that the average gunner must perform in order to reach classification standard. In addition to this, in camp

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they have horses to groom and harness to clean, while the gunners are mostly mechanized. They get no extra pay and, if they fail to classify, are mulcted of their bounty. They can, however, in the evenings, learn the technical part of their trade, though the horse holders and I.C. drivers have but little to do.

With these difficulties in view, the writer would advocate some such system of training as follows:—

NOVEMBER—DECEMBER.—Promotion classes for likely N.C.O.'s, coupled with re-drilling of the squad by all attending parades. This necessitates the section commanders taking their place in the detachments and acts as a refresher course for them and the Nos. 1, also lets the men see that their instructors know their job as well as, or better than, they do themselves.

JANUARY.—The battery is detailed into squads, each under a No. 1 and they are drilled in the duties of one number at a time. Number 1 squad, for example, may on one evening do nothing but the duties of No. 4, while the signallers may be having elementary gun drill in order to teach them the difference between 5 minutes and 5 degs. angle of sight.

FEBRUARY—MARCH.—The signallers commence their technical training, the I.C. drivers and horseholders are put on harness cleaning together with lectures on manœuvre, demonstrated by (and they are made to work) a battery of toy soldiers, while the more promising layers are squadded into a laying squad which becomes the sole preoccupation of the P.S.I. The remainder are kept under Nos. 1 on elementary gun drill, the principle adopted being gun control. This leaves the officers available for supervision and enables the B.C. and G.P.O. to devote their time to the training of the specialists, in so far as this can be done indoors. Much can be done with a director on a good sand table, provided that the sand table has been constructed to scale of a map. In the writer's unit, a $\frac{1}{20000}$ map of the Larkhill ranges was borrowed, and a sand model over a portion of this constructed to a scale of $\frac{1}{600}$ the contours being magnified to "make it more difficult." An O.P. was built in a corner of the room, with three loop-holes of varying heights for observation. Two-lead telephone lines were installed from there to the signal store, and the O.P. regularly manned in the approved manner. Considerable work has been done in this way in the

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training of the B.C.A. as regards actual shooting, silent registration of a zone (ranges being imaginary, since the B and S range finder will not operate on a sand model), while the G.P.O.A., B.C.A., and the range taker were trained in the computation of a predicted shoot, the co-ordinates of the target being taken off a map and an arbitary bearing picket being computed, also off the map, from which a bearing picket card was made up and an imaginary subtense angle given, a burst being put down on the sand model to show errors of accuracy in computation. Both assistants and the range taker, together with three substitutes are also trained in the preparation of a panorama.

APRIL—MAY—JUNE.—At or after Easter camp, the battery is split up into what is hoped will be the subsections for camp and, during April and May, subsection training is performed under the Nos. 1, the laying squad under the P.S.I. continuing to function on one night a week. In June, section training is supposed to take place, although the difficulties in connection with the attendance of all members of a section on any one particular night, render this more effective in the abstract than the concrete.

JULY.—By this time, most of the returns have come in from the employers with regard to the attendance, or otherwise, of the employés. A final roster can therefore be made up and the subsections definitely allotted. In so far as can be managed, battery gun drill is the order of the day. The battery staff go out mounted, if possible, on three Sundays before camp, taking with them Nos. 1 also mounted, as a skeleton battery for the reconaissance and occupation of positions. On these occasions, no actual signalling is indulged in, as this can be done in the drill hall. As soon as the signallers are "through" by visual and line and the position has been occupied by the Nos. 1 and battery leader, to the satisfaction of the G.P.O., a fresh move is made, in order to make the most of the limited time available for mounted manœuvre. The P.S.I. as usual, holds a watching brief.

As will be seen from the above rather Utopian programme, the P.S.I. has but little to do in the actual training of the unit, with the exception of the young layers. It may be that, from his point of view, his life is not so interesting as it would be under a B.C. of the opposite school of thought. At the same time, however, he

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has the consolation of knowing that the unit to which he is attached is training on sound principles and that the less he is asked to do the better is the instruction which he is giving. Refresher courses in signalling and gunnery in alternate years, keep him up-to-date, while the office work, being under a B.C. who is probably in civil life a business man, gives him an insight into quasi commercial methods which may stand him in good stead when his service is finished.

If the writer's contentions with regard to this system of training and this method of employing the P.S.I. are correct, it would appear that there is no objection, but rather a positive advantage to be gained by posting P.S.I's to units for longer periods than those at present allowed, since under this régime the role of a P.S.I. is that of a clerk capable of instructing, rather than an instructor more or less capable of fulfilling the functions of a clerk.

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THE UTILITY OF PERMANENT FORTIFICATION.

By Lieut.-Colonel Morin.

(Translated from the Revue Militaire Française, May, 1930.)

By Brig.-General W. Evans, C.M.G., D.S.O.

NOW that France feeling herself weakened by the evacuation of the Rhine proposes to make use of permanent fortifications to compensate for this lack of security, it is as well to consider whether this use of fortifications is sound and what it can accomplish. To answer this question let us sketch rapidly the defensive organization in existence in 1914, and see what its role was in the Great War. . . .

(1) *Defensive Organization of N.E. France in* 1914. (*See sketch* 1).

This organization resulted from a plan drawn up by General Séré de Rivières in 1874. The plan provided for three positions.

(i) A frontier position.

(ii) An intermediate position with forts at Dijon, Langres, Besançon, Rheims, Laon, La Fère covering Paris at long range.

(iii) Fortifications round Paris.

All along the German frontier the frontier position comprised mainly the defensive works of Belfort, Upper Moselle, Epinal, Toul, Côtes de Meuse, Verdun, leaving as free passages gaps at Charmes and Stenay. Along the Belgian frontier, Séré de Rivières established forts at Mezieres, Maubeuge, Valenciennes and Lille to cover the principal lines of advance.

This plan was the outcome of the lessons of the 1870 war, but was only partly completed. The great expense that would be incurred in reinforcing the forts with concrete to make them capable of resisting modern high explosive shell, and also the predominance of pacifist ideas led to a reduction of the programme. The forts of the intermediate position were not strengthened and finally were given up. Along the Belgian frontier only the fort at Maubeuge was to be kept up; though work had not begun on it soon enough for it to be of use in 1914.

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Only the Verdun forts, Toul, Epinal, Belfort, were strengthened in such a manner as to render them capable of standing modern artillery fire. The defences of the Toul area, with its advanced works at FROUARD, Forest of HAYE, PONT-SAINT-VINCENT, had indeed been greatly improved shortly before the commencement of the war by the creation in front of Nancy of a defensive position called the "Couronné de Nancy." Its principal zone of defence was marked by the plateau of Faux, Mont d'Amance, Pulnoy, Cerceuil, the plateau of Rambetant.

Owing to the late date at which these works were put in hand, the war intervened before they were completed, but work was continued on them by the troops responsible for their defence. To sum up, on August 2, 1914, the defences of N.E. France mainly consisted of: The defensive works Belfort, Epinal, the works at Toul, Verdun with their extension of the Couronné de Nancy; the extensive defences of Paris. . . There remained isolated towns that had not been strengthened and either given up as forts or partly strengthened, and these had very little value.

2. *Influence of the French defensive organization on the German plan of campaign.*

Counting on the length of time necessary for the mobilization and concentration of the Russian armies, the German plan was to destroy the armed forces of France before the main body of the Russian forces could take the field. The original plan dated from 1905 and was due to General von Schlieffen. It embraces two ideas: to break into Northern France so as to turn the system of defences, and then to keep their right flank constantly manœuvring to turn each French position in succession, and to "roll up" the French Armies on themselves and push them towards the Jura Mountains and the Swiss Frontier.

Using nearly all the German forces, Schlieffen proposed forming a huge striking force concentrated between Dutch Limbourg, and the German "Moselstellung"—(the fortified region Metz, Thionville). This mass was to move forward in a solid block pivoting round the Moselstellung. Its left would be covered towards the south by a defensive force, supported on the west by Metz, and on the east by the fortified area Mutzig, Strasbourg.

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The actual plan adopted in 1914 by his successor, von Moltke, was certainly Schlieffen's plan, but lacked its main feature which was the subordination of everything else to the right wing. What actually happened was that owing to the speeding up of the Russian concentration, considerable forces were left to guard the Russian front; the German left wing was strengthened to prevent the French from attacking and advancing down the valley of the Sarre to threaten the communications of the attacking wing. In spite of these important modifications the main plan still was for five armies to pivot round the Moselstellung and to turn the French frontier fortifications from the north. (See sketch I.)

In a memo dated 1912 von Moltke wrote: "A frontal attack on the French defensive works on the East would give to operations the character of siege warfare, would take time, and deprive the German Army of the *élan* and initiative of which it is so much in need."

The German High Command had long been aware of the difficulties the French fortifications would cause, and in 1879 William wrote to Bismark: "The French frontier is almost hermetically sealed from Switzerland to Belgium. Even if we succeed in penetrating an unbroken line of fortresses, they would prevent any reinforcements being sent up, and exercise an enormous influence on the stragetical advance of our forces. If we should be victorious, we should no longer be able to follow up the enemy as in 1870, and would have at once to lay siege to this girdle." Evidently this was the origin of the scheme for outflanking the French fortifications from the North.

The outcome of this plan was the necessity for the *violation of Belgian neutrality*, for it was clear that five armies could not be passed through the 30 kilometre gap of Stenay, between Verdun and the Belgian frontier.

This decision procured for the Germans the advantage of a *stragetic surprise* if not for the operations themselves at least for their extension. For even if the French High Command in 1914 were aware that the Germans might attempt to move through Belgium, they never contemplated that their right flank would extend beyond the Meuse. On the other hand it forced England,

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bound by the Treaty of 1839 to guarantee Belgian neutrality, to enter the war on the side of France.

At first England contented herself by taking the following steps: On July 24th after the Austrian ultimatum to Servia, she concentrated the Fleet; on August 2nd she promised the support of the Fleet to France to protect her mercantile marine and coast-line. Only on August 4th after the definite violation of Belgian neutrality did she call on Germany to respect the 1839 Treaty. This ultimatum having had no result, she commenced mobilization on August 5th, and sent to France a force consisting of four infantry and one cavalry divisions. . . . .

Briefly the existence of the French frontier fortifications had in 1914 a preponderant influence on the German plan of campaign and caused her to violate Belgian neutrality. This brought in Belgium and England on France's side. We can therefore conclude that the *permanent fortifications* of N.E. France dominated the German plan. . . . .

3. *Influence of the French defensive works on the war of movement* (*August—September*, 1914.)

To follow the role played by fortification at the commencement of the war, we must give a brief summary of the operations at that time.

A. Operations on the eastern frontier. (See sketch 2.)

Four armies were concerned: VI and VII German Armies under the Crown Prince of Bavaria. 1st French Army (Gen. Dubail.) 2nd French Army (Gen. de Castlenau.) General Joffre's instructions of August 8th, 1914 to the 1st and 2nd Armies were to attack, as soon as their concentration was complete, in a northerly direction so as to menace the communications of the German centre. Thereupon, on August 14th the two French Armies advanced between Metz and the crest of the Vosges. The VI and VII German Armies fell back before them holding a series of well reconnoitred defensive position, until reinforced by six reserve divisions. This reinforcement gave the Germans numerical superiority between Metz and the Vosges (19 to 17 divs.) and on the 20th at MORHANGE they counter-attacked and forced the French 2nd Army to retire S.W. towards the Couronné de Nancy. At the

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same time the 1st Army, whose left was threatened with envelopment, and whose right was violently attacked at Sarrebourg, was obliged to retreat fighting toward the South.

The Crown Prince of Bavaria, thinking the 2nd Army *hors de combat* decided to continue his operations to the south endeavour to surround the 1st French Army, and obtain possession of the "trouée de Charmes," the only free passage through the fortified zone from whence a blow could be struck at the centre of the French armies. Leaving two corps and a cavalry division opposite the Couronné de Nancy he put the rest of his troops in movement towards the south, the IInd Bavarian Corps on the right flank moving in the direction of Charmes.

But General Joffre's orders to the French armies were to hold the trouée de Charmes; 2nd Army from the Couronné de Nancy to the Forest of Charmes; 1st Army thence to the Vosges. Consequently, General Castlenau only leaving on the Couronné a few reserve divisions supported by heavy artillery taken from Toul, disposed his three corps as follows: 20th on the heights of Saffais, 15th and 16th between Saffais and Belchamps (between the Meurthe and Moselle.) By the 23rd this army was again ready to assume the offensive as soon as the opportunity should arise. This occurred the next day, for on August 24th at about 10 hours air patrols of the 2nd Army reported German columns passing along the front of the Couronné, veering in a southerly direction. By so doing they exposed their right flank to the 2nd Army and were moving into the pocket between them and the 1st Army. de Castlenau at once ordered the group of reserve divisions and part of the 20th corps to attack while the remainder of the 20th with the 15th and 16th corps contained the enemy in front. On the night of the 24th—25th reserves of artillery were withdrawn from Toul and brought to the angle N of the Forest of Charmes to enfilade the German main mass of attack. Under these attacks the II Bavarian Corps was thrown back on the Mortagne, this uncovered the XXIth and to cut the story short by that evening the VI German Army was fighting in retreat.

From the *tactical* point of view we see that the fortifications of the Couronné de Nancy—extension of the Verdun and Toul defensive works—fulfilled the following roles—they formed a

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rallying point for the 2nd Army after its defeat at MORHANGE and enabled it to reorganize; they masked the southerly movement of the 2nd Army towards CHARMES; they enabled the 2nd Army to send the bulk of its forces to the centre and right, leaving a small force on the Couronné itself.

From the *strategical* point of view the German VI and VII Armies were forced to give the defences Verdun, Toul, and Epinal a wide berth and made for the gap at Charmes where the French armies awaited and outmanœuvred them. Thus aided by the fortifications the French 1st and 2nd Armies were able to beat off the attack of the German left wing, and assure the security and stability of the French right.

B. Let us now examine the role of permanent fortifications in the battle of the Marne.

It is well known that General Joffre surprised by the extension of the German right wing, after a vain attempt at resistance near the Belgian frontier, had to withdraw the 3rd, 4th and 5th Armies towards the south before the V, IV, III, II, and I German Armies, The British Army on the left conformed to this movement in retreat.

Relying on the 1st and 2nd Armies supported by the permament fortifications of the north east for the security of his right flank Joffre withdrew the principal bulk of the French armies using the fortified town of Verdun as a pivot. This manœuvre was carried out covered by rearguards who utilized favourable ground to retard the enemy by short and violent actions, of which the dominant feature was artillery. The retreat was to continue until the 6th French Army was constituted on the West with the object of outflanking the German right, and until conditions should be favourable to undertake a counter-offensive. The opportunity arose when the left of the French Armies and the British Army were level with Paris; with their centre between the Marne and Seine.

Let us now see what was happening about Verdun. (See sketch III.) At the end of August the 3rd French Army, strength three corps, one group of reserve divisions and a cavalry division, was retiring between the Vth German Army—strength five corps, five landwehr brigades, and one cavalry corps.

On August 28th General Joffre withdrew one division from

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this 3rd Army, to help form a new army (Foch) whose formation had become necessary owing to the extension of the French front.

On September 2nd he again indented on the 3rd Army for a corps which he sent to Paris to reinforce the 6th Army.

The 3rd Army had, therefore, to hold on with a strength about half the Vth German Army, but recognizing the support that Verdun (with its mobile force of one Reserve division) and the defensive works of Verdun and Toul, would give him, General Sarrail brought his two active corps to the west of Verdun. Their role was to fall back as slowly as possible before the Vth German Army keeping their right on Verdun, and their left in touch with the 4th Army. To cover them to the East, Sarrail relied on the defences of the Côtes de Meuse. In addition he destroyed the bridges over the Meuse and posted his cavalry division near the left bank. The group of reserve divisions was in position of readiness between these two groupings.

The Crown Prince, nearing Verdun, decided to attack the 3rd Army by massing the greater part of his forces against the two French corps west of the fort. But wishing at the same time to profit by the salient occupied by the 3rd Army, on September 2nd he sent the Vth Corps S.E. of Verdun to take the 3rd Army in rear. This resulted in the Vth German Army becoming very much strung out as they had not only to leave troops opposite Verdun, but also to make a long detour to avoid artillery fire from the forts.

Meanwhile, what was happening about Paris?

The German Armies[1] were pushing on rapidly after the retreating French and English Armies.

On August 25th German General Headquarters had decided the lines of advance for the armies of the west as follows. (See sketch I.)

I Army to the west of the Oise, towards the lower Seine.
II Army on Paris.
III ,, on Château-Thierry.
IV ,, on Epernay

But different events had intervened to alter the line of march of these armies.

[1] Two Corps were left behind at Maubeuge and investing Antwerp.

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The resistance offered by the French Armies during their retreat, notably the counter stroke at Guise, which caused the first change in direction of the I Army towards the S.E. in response to a call for assistance by the II Army; the hasty retreat of the British and the 5th Army; the intention of the German armies to turn the French right; the presence of the fortifications round Paris which the Germans were unwilling to face.

For all these reasons the Germans had made a turn to the S.E. More especially von Kluck's army on the right, occupied on September 2nd the line Creil, La Ferté-Milon, Château-Thierry. The next few days obsessed by his wish to get round the left of the 5th Army, von Klück left one single corps (IV Res. Corps) in front of Paris, and accentuated still more his change in direction to the S.E. General Joffre informed of this fact and urged amongst others by General Gallieni, the Governor of Paris, judged that the time had arrived for a counter offensive. Accordingly, on September 4th he ordered the armies of the centre to stop their retreat towards the south, and to resume the offensive on September 6th in conjunction with the 6th Army moving from Paris. This army was to attack in the direction of the Ourcq to take the 1st German Army in flank and rear.

According to the instructions of the German High Command given between September 2nd and 4th, the tasks of the different German Armies were as follows: I and II should be facing Paris; III to move south (Troyes); IV and V by a determined advance S.E. were to open up the Trouée de Charmes for the VI and VII Armies.

The Vth Army had the special task of attempting to break through the defences of Côtes de Meuse with its left wing by taking the forts of Troyon, Paroches, and the Roman Camp.

von Klück, by moving S. of the Marne, was not conforming to this plan. Learning on the night 5—6th September that the one corps left to cover Paris was being attacked in flank by the 6th French Army, he realized the mistake he had made in leaving Paris alone. He then moved all his corps one by one to the Ourcq to meet the attack of the 6th Army. This move left a gap of 40 kilometres between his army and the II (von Bülow) which the two cavalry corps left to look after it were unable to hold.

General Joffre pushed the left of the 5th and the British Armies

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into this gap. These armies reached the Marne, whose bridges were intact at Nanteuil and Château-Thierry, and crossed it on September 9th. von Bülow, whose right had already begun to yield to the pressure ef the French 5th Army (Marchais-en-Brie) hearing the Allies were over the Marne, feared his right would be outflanked and ordered a retreat.

This retreat extended to von Klück's Army who were threatened with envelopment, and also to the III and IV Armies who failed to break the French centre.

* * * * *

Neither did the Vth German Army succeed in breaking through the 3rd French Army in spite of its numerical superiority and its attack on the rear by the V Corps. (Sketch III.) Indeed, although the 4th Army kept drifting away towards the south-west, General Sarrail managed to keep touch with it and Verdun at the same time. To accomplish this he utilized the group of reserve divisions to extend his right, and filled up a gap on his left by the 15th Corps which had now been placed at his disposal. It is true that his right had had to fall back nearly as far as Souilly, but this locality was so close to the southern forts than an outflanking movement by the Germans was impossible.

Under these conditions the frontal attack made by the left of the V German Army weakened as it was by the extent it covered, did not lead to a decision. Moreover, the attack on the rear launched by the V Corps and the general reserve from Metz, necessitated a methodical bombardment of the forts of the defensive curtain and this required time. The 305 m/m guns which had come into action against the fort of Troyon on September 8th had not succeeded in overwhelming the defence and allowing the attackers to take it. It was impossible for the V German Corps to seek a decision further south owing to the presence of the fort of Toul, whose mobile troops (a reserve division) had moved into the Saint-Mihiel area, to reinforce the defence of Sarrail's rear. The result was that on September 11th the German High Command was forced to the conclusion that the attack of the Vth Army having failed to obtain decisive results, its situation was becoming critical, and its retirement from within range of Verdun was necessary.

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The Germans had definitely lost the battle of the Marne.

* * * * *

From the *tactical* point of view we see the Verdun forts and the defensive works of the Côtes de Meuse fulfil the following roles: they allowed the 3rd French Army to beat off the attack of the Vth German Army in their great numerical superiority, by keeping their right up against the forts and making use of their heavy armament; they forced the Vth German Army to extend its front unduly; forced this army to commence a methodical bombardment of the defences before it could attack Sarrail's rear; the fort at Toul and its mobile garrison limited the zone of action of this attack.

As regards Paris, we have seen that the forts covered the organization and movements of the 6th Army and allowed of the surprise attack on the flank of the German First Army.

From a *strategical* point of view we note: the solidity given by Verdun with its line of forts to the right of the retreating French armies; the barrier the two eastern groups of forts opposed to the Germans, and the attraction for them of the Trouée de Charmes; the check caused by Paris to the German operations.

On August 27th von Moltke ordered the advance on Paris. On September 2nd, influenced by von Klück, he agreed to a change in direction towards the south-east, avoiding Paris. On September 5th he again began to be nervous about Paris, and ordered the 1st and 2nd Armies to look after it. "The main forces to keep at such a distance from Paris as not to interfere with their freedom of action."

The permanent fortifications of Paris, however indifferent, and those of Verdun consequently contributed to the victory of the Marne. . . . and there is no doubt that permanent fortifications, even if they are not attacked, handicap the enemy and have a great influence on mobile operations in their vicinity.

4. *Utility of permanent fortification in position warfare.*

This is a self-evident fact; as a proof one has only to mention the word VERDUN. The attack on Verdun by the Germans in 1916 and its failure is so well known that it is unnecessary to repeat its history here. We will therefore content ourselves with noting the

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features in the operation directly concerned with permanent fortification.

Firstly, why was Verdun selected for attack. General Falkenhayn, Chief of the General Staff at the time, gave the reason as follows: "France, having shown great devotion, has very nearly come to the end of her military effort. If the people can be made to understand that she has nothing more to gain by fighting, they will become disheartened and England will be deprived of her best weapon. There are on the Western front within easy range certain objectives for the maintenances of which the French Command must be prepared to sacrifice their last man. If they accept a fight to a finish there, their troops will be exhausted by their enormous losses, whether we gain our objective or not. If they refuse to accept battle and let these objectives fall into our hands the moral effect on France will be incalculable. . . .

. . . The objectives in question are Belfort and Verdun. Nevertheless, the choice should be Verdun. The French line there is less than 20 miles from the German lines of communication. It forms the most powerful *point d'appui* for every hostile attempt to render the whole German front in France and Belgium untenable and that by the employment of comparatively small forces. . . ."

* * * * *

Let us now study the conditions under which the defensive works, particularly the forts, met the attack. The decree of August 5th, 1915, published after the fall of the fortresses during the first year of war, had altered their status, by putting them, their garrisons and all their resources under the commander-in-chief. Consequently, on August 9th, 1915, he gave the following instructions:

"The role of fortresses will be laid down for them, as for the field army, by special instructions from the command. These should be based on the following lines:

(i) Isolated forts liable to be invested have no longer a part to play. Their outer defences should be used in each line of defence working with the field armies, and not as outlying forts of a central citadel. Forts must on no account be defended for their own sake.

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(ii) Fortress troops are field units exactly as are the other formations on the front. Forts will only maintain sufficient garrisons to assume the security and provisioning of such works as it has been determined to keep up, and which are not held by troops in the fighting formations.

(iii) . . . .

(iv) Verdun and Belfort which are actually holding a sector of the front will form part of two fortified areas on a greater scale and will be known as the Verdun and Belfort fortified zones."

When one remembers that during the war the Germans completed the fortification of METZ, one is forced to conclude that there is ample cause for criticism of these instructions which, however, cannot be indulged in here. The least one can say is that they showed a lack of confidence in fortification due to German propaganda following the rapid fall of forts at the beginning of the war, and to the feeble resistance afforded by permanent defensive works to German guns and methods of attack.

In the application of these instructions this lack of confidence led to most unfortunate, not to say incomprehensible, results. While the report submitting the decree of August 5th, 1915, for the President's signature still spoke of the use of defending forts, we find the forts at Verdun actually disarmed. The garrisons and rations were removed as well as the guns and flanking defences. The Engineers received orders to prepare the principal works for destruction (turrets, flanking casemates, walls of moat). This order tacitly admitted that though considered useless by the French, the Germans might turn them to good account. It was in this unfavourable state that the permanent fortifications of Verdun met the German attack on February 21st, 1916.

In view of the rapid arrival of the Germans in front of the zone of forts on the right bank of the Meuse, the General Officer Commanding the Verdun fortified area gave the order on February 24th to prepare the works for demolition. Consequently, on February 25th, 1916, when the Germans arrived before Douamont they only found a few gunners and the parties charged with the demolition, and no infantry garrison. So they were able to take it without a shot being fired.

That same day General Pétain assumed command, at once

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saw the mistake made in abandoning the forts, and gave the following orders concerning their re-armament.

"The experience of the recent fighting has proved the capacity for resistance of forts. These are naturally better organized than strong points constructed hastily during a battle (being constructed and scientifically traced without hurry, flanking defences carefully thought out, deep shelters, concreted, etc.), and are no more shell traps than field works as they often cover an equally wide area. The forts, consequently can and should be used wherever they exist for the defence of sectors. The casemates will be re-armed, turrets repaired, charges placed for demolition will be removed and the personnel and material required will be indented for on armies forthwith."

Signed, "Pétain."

(II Army, E.M. 3rd Bureau, 12 Mars, 1916, No. 3717.)

Unfortunately this order appeared too late to save Douamont, which was already in the hands of the enemy, and for the fort of Vaux, whose 75 m/m turret had been blown up (by the French) and where it was impossible to get up guns for the flanking casemates owing to the close proximity of the Germans. In spite of these adverse conditions the forts of Verdun played a great part in the defence of the citadel. Vaux, deprived of its principal weapons of defence put up a heroic resistance and was only conquered by thirst. Froideterre brought the enemy to a standstill on June 23rd, 1916, by fire from its turrets. Souville repelled the assault of two battalions on July 12th, 1916. In fact all the armoured turrets for 75 m/m and 155 m/m guns, and all the concreted shelters successfully withstood all the bombardments of four years of war and one has only to see these forts to realize this fact.

To recapitulate, although allowed to get into a state that weakened their tactical value, the Verdun forts amply justified the confidence testified by General Pétain in his order of March 12th, 1916, and proved that with armour and concrete properly made and sufficiently thick, it was possible to withstand every weapon of attack.

But the actual forts were by no means the only permanent works; there were in addition: positions for artillery and ammunition magazines; telephone wires dug in; lines of approach (road

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and decauville railway). Finally, the works in Verdun itself (magazines, shelters in the town and underground shelters of the citadel. All these organizations were a powerful factor in the defence of Verdun. Ludendorff in his *War Recollections* testifies to their importance. :—"Verdun has cost us much blood. The position of our troops in the attack became steadily worse. The more ground they gained the further they penetrated into a crater area, and used up their strength even apart from the fighting, by having to remain in ground where supply was most difficult, while the French close by found shelter in the permanent works of the fortress in the vicinity." Actually, the victory of Verdun was the result of a combination of leaders, men and forts.

Nevertheless, the battle of Verdun, in spite of the defective condition of the fortifications at the commencement—the very time they were most needed—is a triumphant proof of their *tactical value.*

From this one may even deduce when discussing fortification of the future that: by the use of armour and concrete it is possible to make defensive works capable of defeating all the weapons of attack now in existence, or likely to be met with in the future; *points d'appui* can be constructed capable of a good tactical defence. . . .

From the *strategical point of view* it is to be noted that the Germans in attacking Verdun to lessen the prestige of the French Army and to exhaust its resources were "hoist with their own petard." For they began to lose heavily directly they began fighting in the zone of permanent fortifications and the fact that they had to give up the contest was a blow to their own prestige.

5. *Conclusion.*

We asked at the commencement of this article what permanent fortifications could accomplish?

The above article proves that in France during the war they :—Covered mobilization; protected concentration; dictated a line of approach to the enemy (turning of Verdun vià Belgium, Trouèe de Charmes); formed a pivot for manœvre (Verdun); enabled flank attacks to be made (Couronné de Nancy, Paris); prevented out-flanking movements and attack from the rear. (Paris, defences of

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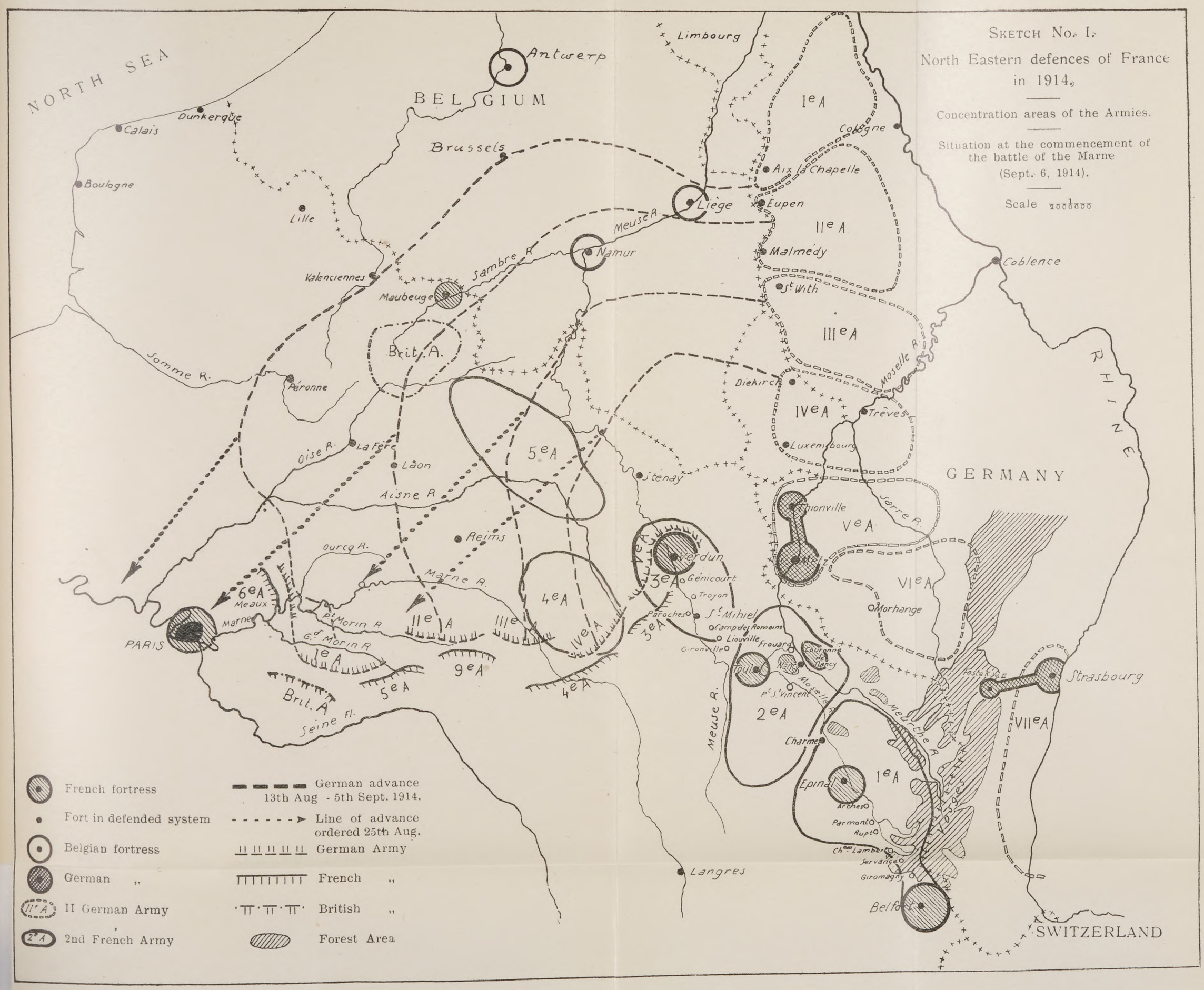

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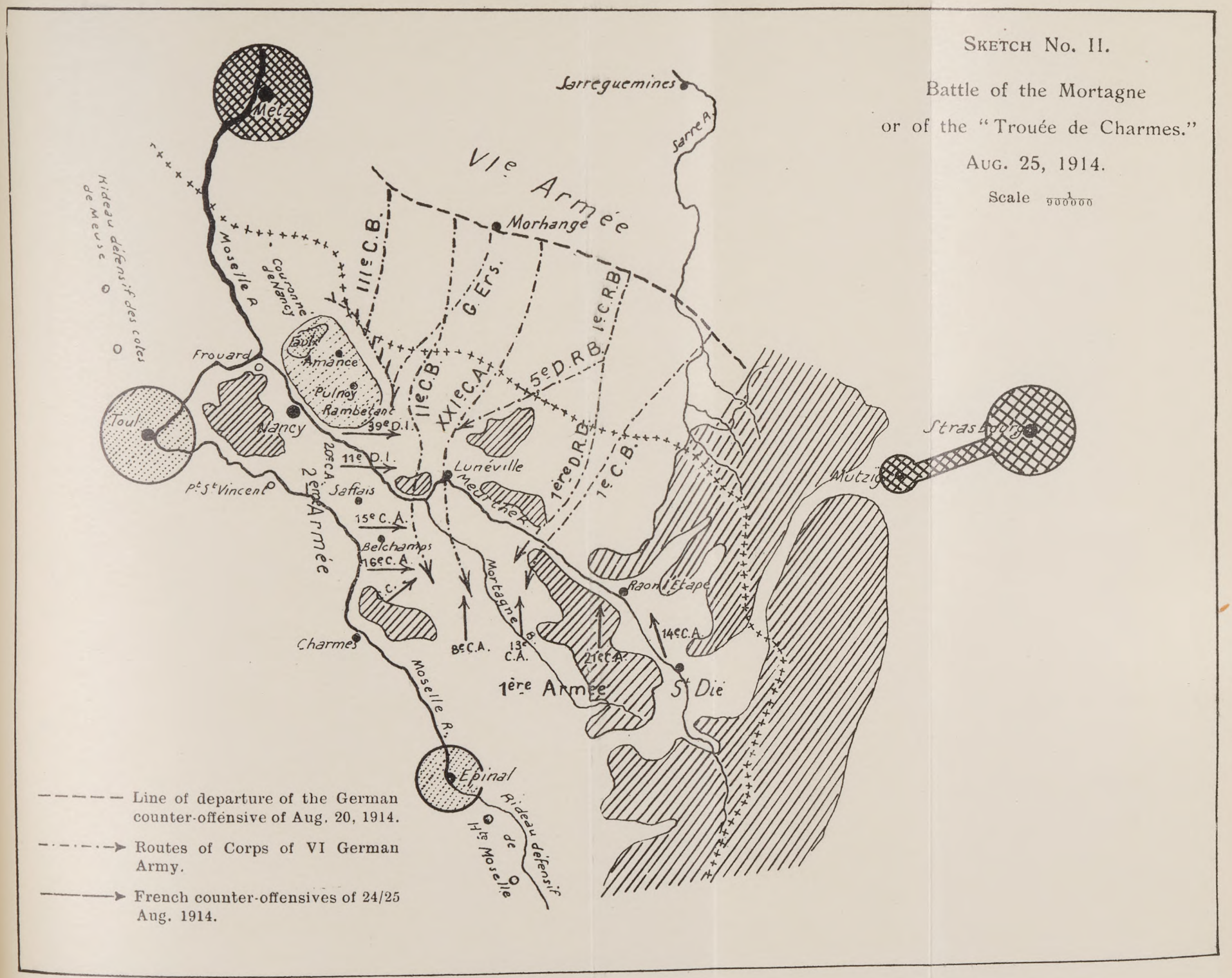

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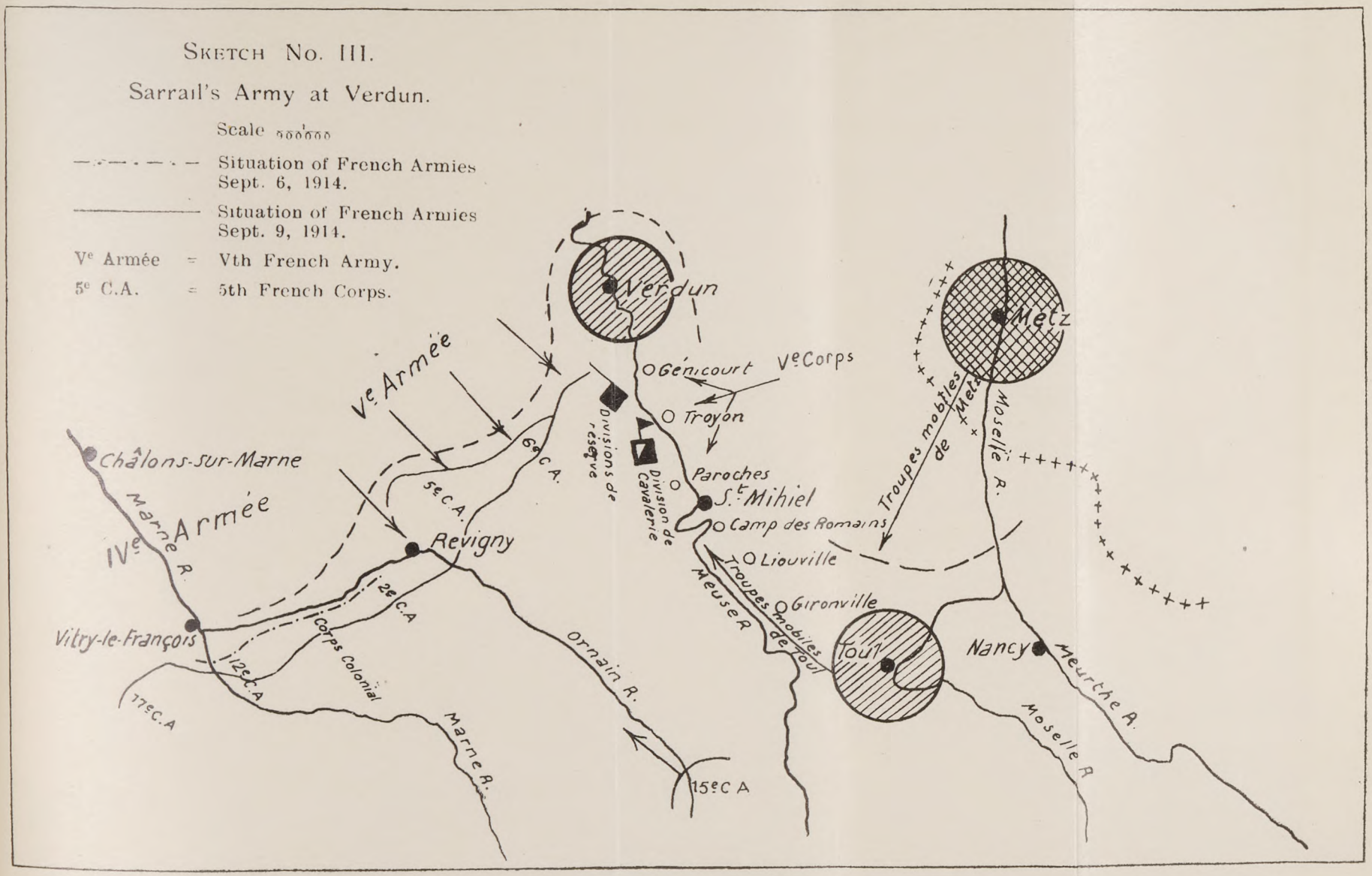
Sketch No. III.
Sarrail's Army at Verdun.
Scale 1/200000
Situation of French Armies Sept. 6, 1914.
Situation of French Armies Sept. 9, 1914.
Ve Armée = Vth French Army.
5e C.A. = 5th French Corps.
Verdun
Metz
Genicourt
Ve Corps
Troyon
Paroches
St. Mihiel
Camp des Romains
Liouville
Gironville
Toul
Nancy
Châlons-sur-Marne
Vitry-le-François
Revigny
Ve Armée
IVe Armée
Marne R.
Meuse R.
Moselle R.
Meurthe R.
Ornain R.
Troupes mobiles de Metz
Troupes mobiles de Toul
Divisions de réserve
Division de Cavalerie
6e C.A.
5e C.A.
2e C.A
12e C.A
17e C.A
Corps Colonial
15e C A

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Côtes de Meuse); defeated a frontal attack (Côtes de Meuse, Verdun). To this, perhaps, might be added: served as a line of departure for an offensive. Did not Falkenhayn write of Verdun that it was "the most powerful *point d'appui* for every hostile attempt to render the whole German front in France and Belgium untenable and that by the employment of comparatively small forces. . . ."

Even if we confine ourselves to the actual uses to which fortifications were put we have seen their value in mobile and static war both from their moral effect and from their power of resistance. . . .

It would therefore appear that permanent fortifications provided one believes in and means to utilise them can be of such stratagetical and tactical value as to fully justify the expense necessary for their maintenance.

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TRIBAL ORDNANCE.

By Captain E. E. French, M.C., R.A.

IN 1926 it became known to the Political Authorities on the North West Frontier of India that a leading Shaman Khel Malik, of the Mahsud country in Waziristan, had taken a skilled workman to his country with the intention of making a gun.

The workman in question was reported to be a native of the Kohat Pass, where there are several factories turning out inferior, but nevertheless good copies of the various Government rifles. The man was said to have been employed for a while in some Government Arsenal, and it seems certain that he had for a time been working in the rifle factory maintained by the ruling Chief of Swat, a hill State in the Frontier Province.

Work on the projected gun commenced in April, 1926, and was reported as complete in the following January, when a number of rounds were fired from it. The workman was then escorted to Razmak, given Rs. 3,500 for the work and permitted to depart.

The matter of this gun did not again come into prominence until 1930, when its owner, in company with other tribal leaders, and urged by agents of the Indian Congress, raised a Lashkar and commenced a series of attacks upon certain friendly villages, and some of the frontier posts of the neighbourhood.

The gun was brought into action in July against Sororogha Fort, which is garrisoned by the South Waziristan Scouts, one of the Frontier Corps. The breech block, about which details are lacking, blew out with some damage to the gun crew, and some well directed machine gun fire from the fort closed the incident. The gun was however removed by the tribesmen, but was surrendered later to the political authorities, and removed to Razmak. The piece, as will be seen from the photographs and sketch, has been made in three portions, and like other "pack" guns, is joined by two junction nuts The whole is, however, so difficult to assemble and take down, that it would seem more likely that the division had been made owing to the difficulty of turning and rifling the piece in one portion. All parts were obviously turned. The

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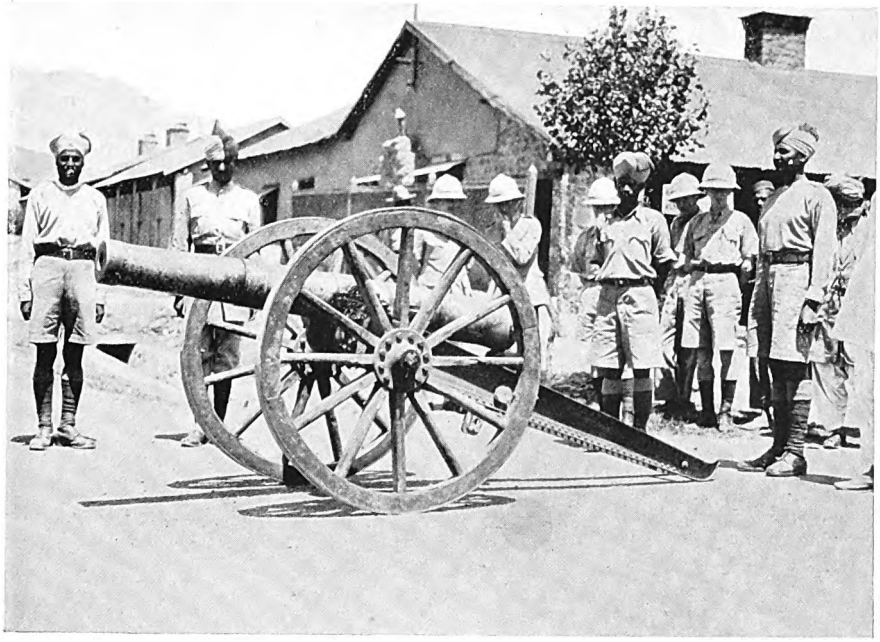

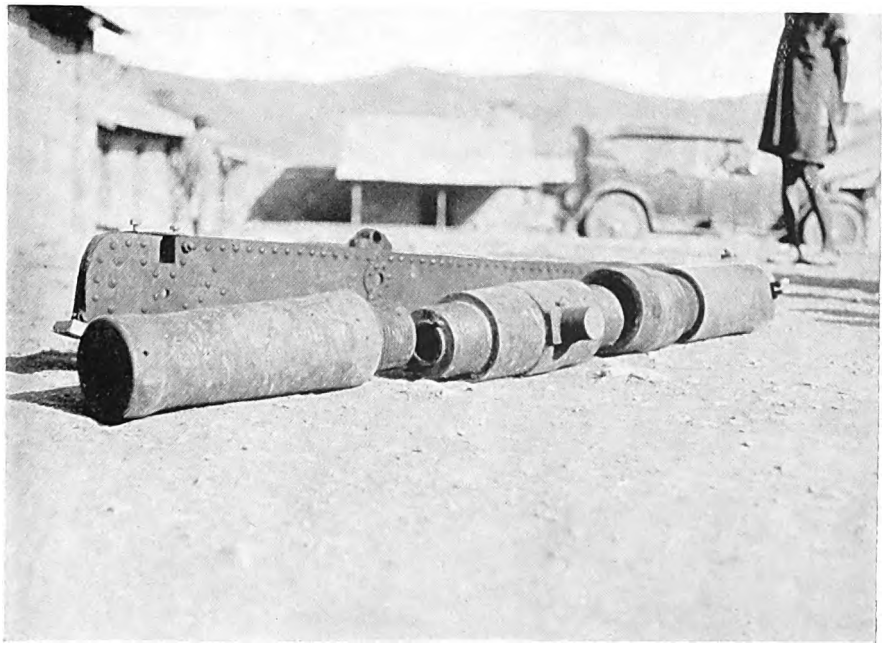

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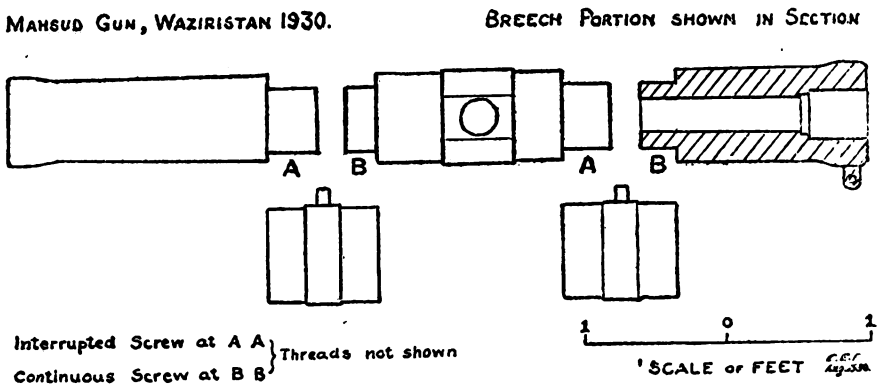
trunnions are borne on a sleeve shrunk on to the centre portion and rivetted. Fitments for sights similar to the tangent sights on the 10 pdr. B.L. Gun, are provided on the left of the piece, and there is a lug for an elevating screw at the breech end.

The bore is approximately 2·8 ins. calibre, there are 16 grooves regular in twist, and approximately one third of a turn is completed in the full length of the bore. At the rear of the chamber there is recessing for an extractor, but neither this nor a cartridge case are obtainable.

The carriage consists of two plates of iron heavily reinforced and bolted, and fitted with axle trees and cap squares in brass. The axle is apparently from an ordinary Indian A.T. Cart, reduced in length, and fitted with A.T. cart wheels. Of the cartridge nothing can be ascertained but the shells, judging by one which was fired at Sororogha Fort, are solid, and were evidently turned out as a bar of metal, and then separated one from another by a blow with a cold chisel. They are fitted with an excellent driving band of copper brazed at the join, and this driving band appears to have acted satisfactorily and without any tendency to shearing. The weight of the shell is 8lbs., and a range of upwards of 2,500 yds. was obtained with it. The gun is a good example of the ingenuity of the tribesmen, even though it cannot be regarded very seriously by regular troops. Their reluctance to surrender the gun as one of the terms of settlement for their misdeeds is a proof, however, that it was regarded among the tribes as a weapon of first importance.



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TORIN, THE BLACK SHEEP.

A TALE OF THE INDIAN FRONTIER 30 ODD YEARS AGO.

BY BRIG.-GENERAL COSMO STEWART, C.B., C.M.G., D.S.O.

SUBADAR Zarghun, a Kamba Khel Afridi, had been several days overdue in rejoining from furlough. He commanded a company in that famous corps, known throughout the Punjab Frontier Force as the "Rooke Sahib ki Paltan." This was not a very unusual occurrence, and did not greatly perturb the regimental authorities. It was a case certainly not legislated for in any of those numerous and stupendous volumes known as "Army Regulations, India", which so constantly exercised the imaginative and inventive faculties of the British officers. The latter knew of course that much vexatious, and probably not altogether veracious, correspondence must ensue, before the curry bat and gram fed baboos of the Army Pay Department could be induced to waive their legitimate claims to dock the old gentleman's pay, but in such matters they had had liberal educations. They appreciated however that the subadar might be relied on to take very good care of himself, and realized there might well be some small private matter rendering it eminently impolitic for him (or for any other trans-border soldier in like case), to be too rigidly bound by specified dates and routes, when returning from leave in his own country.

For the niceties of personal differences in No Man's Land were matters which even "A.R.I." had not dared to define, and so were officially ignored. And where no regulation could be quoted in all that massive library, it was obvious to the meanest intellect that nothing short of a decision by the Viceroy in Council could authorize irregular expenditure if the true facts were stated; and he, poor man, was much harassed and often busy over greater things, so such a ruling was not easy to obtain. Yet private enemies had ample scope for opportunity between the homes of Pathan soldiers and the British border. The subject of leave overstayed was not therefore even mentioned, when Zarghun, arrayed in his

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best and most spotless mufti, presented himself informally at the house of his colonel to pay his respects. The two were old and trusted comrades. The interview which followed placed Army Headquarters in possession of an invaluable and very shrewd appreciation of the state of tribal feeling across the frontier, and of much up-to-date and trustworthy information concerning the movements and activities of several notorious gentlemen, in whom the Powers That Be had good reason to take an interest.

Before dismissing his old friend, the colonel made some enquiries regarding the prospects of recruiting over the border. As was his habit, Zarghun expressed his disappointment with the rising generation. He could not imagine what had come over the young men of the present day; neither in physique nor in spirit could they compare at all with the young men of his own and the Colonel Sahib's youth. Nevertheless he had brought back with him five or six lads, who might in time be found fit to serve the Sirkar, and he hoped the Colonel Sahib would not be too critical of their obvious shortcomings. The next morning, six stalwart young men were produced for inspection. The adjutant and the drill staff, whose business it was to lick the raw material into shape, could only with difficulty conceal their satisfaction, and did not at all think the "umedwars" (i.e. "hopeful ones") merited the disparaging strictures of their recruiter. They were in fact a particularly fine lot. Their awkward attempts to stand to attention, at saluting, at marching in step; their quite unusually clean clothes, their freshly tonsured heads and washed faces—all proved they had already been taken in hand in anticipation of approval by the smart young drill instructor, a nephew of Zarghun's, who had accompanied his uncle on furlough. A few kindly questions were answered with sheepish grins and much audible prompting from their Mentor; they were then marched off to hospital for medical inspection prior to enlistment.

While this preliminary examination was going on, the adjutant noticed a seventh youth, a dirty, unpleasing looking, lanky boy, who made repeated efforts to push himself forward, and to get himself also enlisted; but each time he was at once elbowed out of the way by interested spectators. On enquiry, it transpired he was a Zakha Khel Afridi, by name Torin, signifying "The Black".

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Each section of the great Afridi tribe, like the Highland clans even in our own day, with a wholely laudable conceit, fancied themselves a cut above their fellows, and in this respect the Zakha Khel were no exception. They were the most lawless and the least civilized of the Afridis, and perhaps partly for this reason it was not the custom to enlist them in the "Rookies." Although recognized as part of the tribe, they were looked down on, perhaps because they were rather feared, by the Kamba Khel, the Malikdin Khel, the Kuki Khel, and other clans from which the Pathans for the regiment were drawn. It appeared that Torin, hearing that Zarghun was about to return to his regiment, had asked to be allowed to attach himself to the party for safe conduct across the border, and had been brought down in the capacity of servant to the Subadar. On this explanation the question of his enlistment was decided in the negative, and the matter dropped.

Not long before this, a popular and distinguished officer in the Goorkha Regiment which formed a part of the Frontier Force, had introduced the idea of "khud" racing. He himself was an enthusiast in everything connected with mountain climbing. He was not only a member of the Alpine Club, and had spent a large proportion of his leave at home climbing in Switzerland, but he had at different times at his own expense taken one or two of his little men to that country and had them instructed in all the technicalities of the art by Swiss guides. Other officers in the regiment had done the same. Incidentally it may be mentioned that two of these Goorkhas were lost with Mr. Mummery, the great Alpine climber, in the attempt in 1896 to climb Nanga Parbat. At the time I write of, this enterprising officer had produced several teams of Goorkhas, who so far had proved themselves undefeatable at khud racing. The test was a very severe one, and consisted in ascending and descending anything over two thousand feet of precipitous hillside at racing speed, and demanded the very highest standard of physical endurance and fitness, as well as the utmost sureness of foot and eye. To other regiments of the Force, who enlisted trans-border Pathans, it was an unspeakable reflection that their men should be beaten at this game by the monkey-like little Goorkhas, for with them it had always been an unquestioned article of faith that the Afridi had not his equal on a hillside. An

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inter-regimental competition had come to be an annual event of skill at arms, but so far the Goorkhas had carried all before them.

Every self-respecting battalion as a consequence had been unremitting in its efforts to train and produce a team which should lift the much coveted trophy from off the mess table of the Goorkha officers, and bring it home in triumph to their own. The "Rookies" were especially keen, and at their regimental sports, which were to take place a few days after the return of Zarghun with his recruits, by far the most important event was the khud race, at which the regimental representatives were to be selected to compete for the inter-regimental cup, and, as it was hoped, to put an end to this most undesirable and even humiliating state of affairs.

When the selected athletes paraded for the start, it was seen to the indignation and astonishment of all that Torin, the rejected recruit, had lined up with them, and he was at once thrown out with contumely. Nevertheless, when the race actually commenced, it was observed that he had managed to get away with them, easily distinguishable among the others by his dirty apparel. The spectators could scarcely believe their eyes, when they beheld him leap to the front at once, and lead the favourites on whom the betting was keenest all the way up hill in a truly marvellous manner. On arrival at the top he turned to come down again; the descent if anything demanded greater agility and skill than the ascent. A Pathan does not only run down what appears to the ordinary individual breakneck ground; he leaps apparently recklessly out into space, lands somehow on his feet, rushes a few paces, and then bounds away again to land feet below. Torin exceeded anything anyone had previously witnessed, improved his already considerable lead, and won easily. After this wonderful performance, there could no longer be the slightest question as to his enlistment, and the next day he was formally entered on the muster roll of the "Rooke Sahib ki Paltan."

Torin proved an unsatisfactory recruit. No amount of instruction could make him anything but a third-class shot; he appeared lacking in general intelligence; he was resentful of discipline and quarrelsome among his comrades, among whom he was never popular. Had it not been for his superlative performance in the khud race, and the great keenness of all ranks to defeat

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the Goorkhas, the regiment would have been glad to be rid of him. For an ill-conditioned Pathan, like any other sulky soldier, is not only a general nuisance, but he is a positive danger; no man can tell when his temper will not break out over some real or fancied slight, and then he is liable to turn nasty.

As it proved, Torin was not destined to lower the colours of the exultant Goorkhas. Before the inter-regimental race could take place, one of those periodical and curious waves of unrest swept over the whole frontier. Incited by their pernicious mullahs, one tribe after another declared the "Jehad", or religious war, against the Sirkar. It has ever been a saving grace that the leaders among the tribesmen, who are almost invariably the mullahs, have been unable to organize them for concerted action, and no simultaneous rising among the two or three hundred thousand wild fighting men has ever occurred. Tribal jealousies, and rivalries between the holy men themselves, have always sufficed hitherto to render combination unattainable. But the possibility of such combined action in the future, brought about by Pan Islamic or Bolshevik machinations, hangs like a sword of Damocles over the head of the Government of India, and one which can never be disregarded. It is ever present when any local outbreak occurs, and is a peril which those who blather lightly of Self Government for India and the de-Europeanizing of the Indian Army, find it convenient to forget. Thus the risings which occurred among the tribes at the time I speak of succeeded one another at intervals. An unprovoked attack on a body of troops by Wazirs in the Tochi Valley was dealt with before the tribes further north broke out; but it was considered necessary to assemble a force in the Kurram Valley to safeguard the Turi population, who had claimed and obtained British protection, from the depredations of the Afghan and other Sunni clans by whom they were surrounded.

The "Rooke Sahib ki Paltan" formed one of the battalions included in the Kurram Force, and while on this duty was located in an entrenched camp close up on the tribal border. One morning the battalion was shocked to hear of the treachery of a member of one of its double sentries outside the perimeter. According to old established frontier custom, these duties are always detailed to pairs of men, consisting of one Hindu and one Muhammadan

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soldier. The Muhammadan of one such pair had stabbed his Hindu comrade during his period of night duty, killing him, and had made off with the rifles and ammunition of both. When it transpired that the deserter who had brought such disgrace on the regiment was none other than the black sheep Torin, the indignation of the Pathan company to which he belonged, knew no bounds, and by no one in the company was the shame more bitterly felt than by Subardar Zarghun, who felt himself responsible for Torin's enlistment. There was a wise regulation which imposed a heavy fine, far in excess of the intrinsic value of the weapon, on all ranks of a Pathan company for every rifle stolen or lost, and old Zarghun insisted on paying this out of his own pocket.

The next evening the usual sniping into camp was much increased, and an unnatural howling, as of many jackals, seemed to presage a serious attack. Officers and men slept equipped on their posts under cover of the rough stone wall or sangar which enclosed the camp, and protected the transport, hospitals and other non-combatant units parked inside from any sudden rush; and it was well they did so. After midnight the sniping grew steadily in intensity, and culminated in a furious fusillade from all manner of weapons, and from all sides out of the darkness. Such firing is always wild, and little damage resulted, the sangars giving good cover. The bullets from modern rifles which were not stopped by the wall flew clear over camp, and it was hoped they would account for some casualties among the tribesmen on the far side. Antiquated weapons, such as ancient Tower muskets and jezails, and even a gun improvized out of a length of galvanized iron piping, bound with raw hide, were more effective from the enemy's point of view. Their missiles, consisting of slugs, stones, pieces of chopped wire, and anything else handy, besides being alarmingly noisy in flight, had not sufficient velocity to carry over the camp, and plentifully besprinkled it, the transport being the worst sufferers.

The troops, all frontier veterans, withheld their fire, not wasting ammunition by blazing off into the darkness. But every now and again the mountain battery discharged a star shell, which would light up the whole surroundings, and then the troops would fire steady volleys at any body of tribesmen gathering possibly for

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assault, or at any other good target. During the lulls in the firing, the voices of the mullahs could be heard exhorting and encouraging their followers, generally from a safe distance; they heaped the wildest abuse on the troops, generously promised their adherents immunity from the bullets of the infidels (although a large proportion of the latter were good Muhammadans!), and somewhat illogically assured them of paradise, should they be killed in the holy cause.

The tribesmen were not altogether unsophisticated, or else their fanaticism had not been sufficiently aroused. They appeared lacking in initiative to test the promises of their church militant, and preferred the certainty of present existence to the anticipations of Paradise to come. They showed a quite correct appreciation of the steady fire discipline of the defenders, hesitated to incur the peril of crossing the cleared zone round the camp, with the further prospect of encountering the ring of bayonets, which they knew would be waiting for them on the other side. They made no attempt to get to close quarters, but contented themselves with furious bursts of fire and much shouting. One voice in particular was easily distinguishable and could be heard addressing the most outrageous insults at the Rooke Sahib ki Paltan; from the extremely personal nature of the remarks, the Afridi company had not the slightest difficulty in associating the voice with the deserter Torin. So enraged did the men become, that it was only with difficulty that their British officers restrained them from charging to wipe out the insults in blood.

The action continued with intermissions till the hour of dawn approached, when shortage of ammunition, and perhaps the fear of being caught by the troops in daylight, caused the enemy to disperse to their hills. As soon as light permitted troops were despatched in pursuit, but without much result beyond finding ample evidence in the rocky, scrub-covered ground that their volley of the preceding night had not been without effect, especially where the improvized cannon had been in action. Here fragments of piping and blood traces left little doubt that the tribal gunners had placed greater confidence in their Master of the Ordnance than had been justified. But of the traitor Torin there were no signs.

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Rising followed rising up and down the frontier, with which we are not concerned. In accordance with the sportsmanlike policy of Government, the "Rookies" were sent to another part of the border, so that they should not be subjected to the trial of fighting against their own kith and kin, and where as ever they rendered splendid service.

It was not till after many months of fighting that the Afridi clans realized that although they might score minor successes, and could and did inflict considerable loss and privation on the troops, they were practically powerless to prevent the armies of the Sirkar from penetrating at will into any part of their mountains, and even into their stronghold of Tirah. They then submitted to terms.

It was only then that the much-needed leave could be reopened to Pathan soldiers from over the frontier. Not only had they their family matters to settle, such as marriages, perhaps some small matter of a feud, and the intense longing which every Pathan has after being away to see his native glen again, but they knew that the fines assessed by Government on conclusion of the recent troubles had been dealt out to each clan, and that these would be again allotted by local jirgahs to families and individuals. It would fare ill with the families of those who were absent at such a time, and all were anxious to return and get off as much of their share as possible. And so Zarghun, with a large proportion of the Afridi company at length departed on furlough.

Zarghun had an hereditary enemy. This enemy lived, as was proper, in his castle over against the castle of Zarghun, within sight of it and close by on the same hillside. Each consisted of the usual Afridi homestead, surrounded by a formidable mud wall with a big high tower in the centre to serve as keep. The towers were so sited so as to command the family acres, which lay round about, generally at a lower level, in the form of terraced fields. The arrangement was suitable so long as the firearms in possession of the tribesmen were almost entirely limited to jezails and other indifferent weapons, as it permitted each side keeping a watchful eye on the outgoings and incomings of its opposite numbers, while safeguarding its own possessions.

But with the advent of modern rifles (and modern rifles became less rare after the hostilities with the British), it became possible

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from the commanding positions afforded by the towers to protect not only the family acres, but also to cover most of those which belonged to the enemy. The peaceful avocation of an agriculturalist would have become more or less mutually impossible under such circumstances, had not a certain etiquette been observed. It therefore became customary, if a temporary truce was desired by either side to enable the occupants to issue forth in comparative safety to till the ground and attend to their crops, for a dirty white rag on a stick to be hung out from their tower, and if a corresponding signal was displayed by the adversary, all might be considered well for the day. The lord of the castle and his myrmidons, and his women and children, might then sally forth with some confidence, leaving a watch on their tower. But if this elementary precaution was not observed, or met with no response, it would be ill advised to do so.

Zarghun was not unduly concerned about the family difference, and perhaps thought that after a year or so of bickering with the troops of the Government, the natural propensities of his neighbours, and even of his hereditary enemy, might for the time being be considered assuaged. He had learnt incidentally through his womenkind, for no ordinance of man will ever prevent women gossiping with their neighbours, that one Torin had taken service with his rival. This gave Zarghun some food for thought, but it was not so much thought for his own personal welfare, as for how he might exact retribution for the never-to-be-forgotten insults hurled at himself and his glorious regiment on a former occasion by such an unspeakable dog of a Zakha Khel; neither was he unmindful of the many rupees he had contributed for the honour of his own company of Afridis, and the disgrace put upon them by the unforgivable theft of rifles.

Zarghun was still turning the matter over in his mind, and had not yet determined on any course of action, when he was rash enough one day to stroll out to inspect his fields, without having attended to the important formality of the flag of truce. He only intended to visit the fields in the immediate vicinity of his own homestead, and omitted to take any escort of two or three armed followers, such as in ordinary times of peace would have been advisable, and even customary. He had soon good reason to regret

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his lack of caution! He had proceeded heedlessly beyond his intention in the direction of the tower of his adversary, preoccupied by his thoughts, when he was narrowly missed by a rifle bullet, which whistled close past him. Although considerably startled, he never lost his self possession. The only cover on the bare fields consisted of the little walls of stones, which formed the terrace revetments. With the greatest presence of mind, he instantly threw up his hands in a realistic manner, and tumbled over under cover of one of these walls, as if badly hit.

He had no doubt who had fired, and remained motionless, thanking his stars that Torin had always been such a bad shot, despite his, Zarghun's efforts to the contrary. At the same time he prayed devoutly that some of his women, whose duty it was to keep a watch at all times from the tower, would have had their attention attracted by the report, and would have seen his predicament. Otherwise it was more than likely that the deserter would come and inspect the result of his effort. His assailant doubtless also realized the danger of being caught in broad daylight in the open, especially after he had disturbed the peace; at all events he did not show himself indiscreetly.

The occurrence had not passed unobserved from Zarghun's stronghold, and very shortly afterwards the hoped-for relief arrived in the form of a rescue party of his own retainers. Torin refrained from firing again; possibly because he felt satisfied with the obvious success of his endeavours and wished to see what transpired, and possibly because he did not desire to draw further attention to himself now that the fat was in the fire, and as he hoped, his enemy slain.

A comedy for the benefit of any onlookers was now enacted, quite after the heart of a Pathan; Zarghun earnestly hoped that it would also prove the setting of a tragedy for some, if they were not prepared for the limitless cunning and resource of the old soldier. Loud shouting, succeeded by shrill lamentations from the women in the homestead, intended purely for the information and gratification of Torin and his associates, proclaimed the lord and master had been killed. Much coming and going took place between Zarghun's abode and the spot where the supposed corpse lay, and this was not interfered with. Sufficient unto the hour was

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the good thereof. Finally a charpoy, or native bedstead, was brought forth, and on it was laid the body of the apparently defunct subadar. Suitably escorted, to the accompaniment of more heartrending wailing, the fallen hero was borne back to his own place, where the indispensable funeral rites would have to be performed, prior to interment.

It would have taken a very suspicious and keen-eyed observer to have noticed that an aged fowl had been brought out concealed with the charpoy, gagged so that it could make no noise. Thanks to the cover provided by the revetment wall, it would have been quite impossible to have seen that on its arrival the unfortunate bird was at once decapitated. After the charpoy with its burden and attendants had retired, nothing remained on the spot to give evidence of the crime save a few torn fragments of blood-stained apparel, a small pool of blood, and a couple of Martini cartridges, which had obviously fallen out of the clothing of the stricken man, and had been left behind unnoticed on the ground in the confusion and stress of the moment.

Zarghun remained for the next few days in strict retirement *chez lui*. The news of his sudden death was unobtrusively noised abroad, and the old man listened grimly and with genuine enjoyment to the comments thereon, which were industriously collected from their neighbours by his womenkind. He grinned sardonically and expressed great satisfaction to his more trusted followers, when it was reported to him next day that there were unmistakable signs that someone had visited the scene of the tragedy during the night, and that the cartridges had been removed.

About the third or fourth day, while the arrangements for a mock funeral, which for obvious reasons could not be much longer delayed, were being discussed, it was announced to Zarghun that Torin had met with a serious accident, his rifle having burst in an altogether inexplicable manner for one of British make. The breech was said to have flown into fragments on discharge, carrying away Torin's left hand, an eye, and a portion of his face. The old subadar, who at first had been extremely mortified by the thought that his enemy had displayed superior acumen, chuckled audibly and became himself once more, and eagerly desired further information. When it was further announced that Torin had been

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removed in a more or less insensible condition to the missionary hospital in the nearest cantonment (an institution much appreciated by the victims of border vendettas, as well as those wounded in hostilities with the British), the old man's satisfaction was patent to all beholders. Hastily settling his affairs till he should come again, Zarghun with a couple of relatives serving in his company, departed by dead of night, and made several forced marches in the hope of forestalling Torin on his road. Should he be able to effect this, it was Zarghun's intention to lay an ambush, and finally to dispose of the hated deserter. Torin's friends, however, fearing pursuit by the outraged relations of Zarghun, were too cunning for him; they either moved with great rapidity, or more probably took an unfrequented route. They managed to cross the tribal border line without being molested, and successfully delivered their charge into the care of the missionaries.

Zarghun reported his arrival with his battalion at the same station, evidently somewhat disgruntled, this time several days before the expiration of his leave. Nothing was allowed to transpire concerning the reappearance of Torin or recent events. But afterwards some of the more observant among the sepoys professed to have noticed that on several occasions certain individuals were summoned to Zarghun's quarters, where they remained closeted with the old officer for some little time. The missionaries were also astonished, when two tall Pathans, obviously soldiers, presented themselves at the hospital, and made particular, and as the former imagined, tender inquiries after their patient. They expressed no desire to see him, but were solicitous as to his progress and anxious to know when he might be discharged. They returned at intervals of several days, and the good missionaries felt gratified at the somewhat uncommon interest evinced by these wild men in one so unfortunate. The visitors were evidently considerably disconcerted when informed eventually that Torin had left. In answer to their interrogations they were told that two of the relatives, who had originally handed over Torin to their good offices, had come to fetch him the day before. Although the missionaries had remonstrated, stating the patient was not yet properly convalescent, and that others also had shown concern in his welfare, his relations had insisted on removing him at once,

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representing it was most urgent Torin should return home without delay. The good Samaritans had therefore regretfully allowed their charge to depart.

The Afridi company recollected subsequently that it was only the next day that a party of four men, one of whom was the nephew of Zarghun, formerly a young drill corporal and now an acting or Lance Sergeant, had departed unexpectedly on short leave for their homes. This was commented on by the sepoys, because it was no longer the leave season, and it was said that Zarghun had interested himself in obtaining the necessary sanction from the Colonel Sahib, which was not like the old subadar during the drill season.

The party returned at the end of a month, and as the incident had aroused mild curiosity in the barrack rooms, it was also commented on casually that they had gone straight to Zarghun's quarters to report themselves, where they had been admitted to the inner sanctum, where few in the ranks ever entered. Some heart burning was aroused because the nephew of Zarghun shortly appeared in regimental orders as promoted to be sergeant over the heads of several others, while before long each of his three companions received an acting corporal's stripe. But any discontent among the men was dispelled by Zarghun himself, who displayed an unaccountable affability and leniency in various small matters. He became for a time much more approachable, and it was even said that he had been observed to smile to himself behind his beard, as if greatly pleased with his thoughts.

Some mystery surrounded the fate of Torin, which was never dispelled satisfactorily. It transpired later that he never reached his home, and also that the leave party passed the border in record time by the same route as had been taken by him, and were then close behind. When a border post is passed, beyond which British law and order does not run, a veil is drawn, which it is not always wise to attempt to lift. But when one day in the hot weather the colonel was carrying out a periodical inspection of the lines, he entered Zarghun's quarters at the latter's request, to consider some repairs to the roof, which the Indian officer desired to have made before the rains set in. He went into the small living room used by Zarghun, and while conversing with the latter, his attention was attracted by a medal of the same pattern as it was customary

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in the regiment to award as prizes for skill at arms competitions. Curious to know when old Zarghun had last completed himself, the colonel picked up the medal to examine the date; to his amazement he saw it was inscribed with the number and name of Torin, and had been awarded to him as the winner of the memorable regimental khud race. This served to recall other incidents to his mind, and being versed in the habits and customs of the Frontier, he replaced the medal and refrained from asking questions. He knew that the subadar might possibly find it inconvenient to answer them truthfully, and that if such was the case, Zarghun would not hesitate to prevaricate in such a matter. But such prizes were greatly valued by the recipients, and the colonel had not the slightest doubt that Torin had never voluntarily parted with his.

A Sherlock Holmes might have deduced a further clue to the mystery of Torin's disappearance from the fact that, prior to proceeding on leave at the time his own life was attempted, Zarghun had attended a class of instruction in the use of high explosives for hasty demolitions. He would no doubt have learnt that high explosives, employed in blasting, were too violent and shattering in their action to be of any use as propellants for projectiles in guns and rifles, and that if so loaded into service cartridge cases provided with suitable means of detonation, they might be used to destroy such weapons. It was possible even that such a method of destroying captured arms might have been demonstrated to the class. The Indian subordinate in the Public Works Department in the station to which Zarghun had returned on completion of his course, and from which he proceeded on leave when his life was attempted, was a Kumba Khel, and a friend of his. This subordinate was in charge of the roads in the district, and was frequently engaged in blasting in connection with such works. Zarghun would probably have experienced no difficulty in obtaining from him small quantities of any ordinary high explosive, had he wished to do so.

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THE LIGHTER SIDE OF WAR.

"SCROUNGING."

By D. A. C.

ONE learnt a thing or two during four years in France and Belgium, more particularly in the ways of providing comfort for man and beast under the most adverse possible conditions; and before what we learnt is buried with us, a few tips, not to be found in Service Regulations or Training Manuals, may be of use to the generation that knows not war. Excellent as these Regulations and Manuals may be, they offer no hints as to any method of overcoming the austerities enforced upon the unfortunate soldier by the limitations of the Equipment Regulations and Mobilization Tables; perhaps the following may help?

Let me remind you that the massing of infantry, the clank of tanks and the booming of the guns do not cover every aspect of war; there is also the very important item of discomfort, an item which hits the individual very hard and one which, in trench warfare at least, takes a lot of trouble to overcome. "Trench warfare", you will say, "why drag in trench warfare when there is never going to be such a horror again?" Well, there is more than one opinion on that subject. The tank fans will tell you that once their war chariots begin to get busy, trenches will be so useless that no one will take the trouble to dig them; on the other hand I have heard it said, and by a very distinguished General, "No trenches—Rot—in the next war everybody will dig so d—d deep that no tank will be able to get at them; then when the tanks have wiped each other out, with the guns on either side giving a helping hand, the lads with the bayonet will come up smiling and the real business will begin." Between these two opinions you can take your choice, but just in case you ever do get mixed up in any trouble similar to that of 1914-1918, take to heart the doings of your predecessors in the Royal Regiment of Artillery as expounded in this veracious chronicle. Let me own at once that these doings were highly irregular, not to say immoral, but had the saving grace of being, shall we say?, expedient.

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By way of preface let us examine the inner meaning of the sub-title, "scrounging"; what exactly does one mean by "scrounging"? Of the many words coined by the fertile brain of the B.E.F. this word "scrounge" has been more abused and debased than any other. I heard a lad say "Where can we scrounge a cup of tea and a muffin?"; what he meant was "cadge" not "scrounge," so deeply has the original meaning of "scrounge" been lost in the lapse of time. The "Vocabulary of the War" had many terms to denote the transference of other people's property from their possession to one's own, the more common being "find" and "scrounge", but there was a very clear and definite distinction between "scrounging" and "finding", *et hoc genus omne.*

"Finding", even though softened after the manner of Shakespeare's genial ruffian, Pistol, with his "the wise convey it call", was just plain stealing, the theft of someone else's property for one's own exclusive use and benefit, a thoroughly contemptible act, but "scrounging" was on a much higher level of morality. By "scrounging" one meant the alienation of other people's property found abandoned, or at least temporarily abandoned, or even carelessly guarded, not for one's own personal benefit but for the benefit of one's men, horses or guns; thus, though the results might be the same to the original possessor, to "find" and to "scrounge" were two very different things.

You will understand better why I am so insistent on the exact meaning of "scrounge" when I tell you that the officers of the Royal Artillery were undoubtedly the best, or worst?, scroungers in the B.E.F., and why for no? The infantry officer had only his men to consider, the cavalry had horses as well as men, but the Gunner had men, horses and guns, and the needs of the guns were sometimes the most difficult of all to satisfy. Do not, however, get away with the idea that the "scrounger" would be patted on the back by Superior Authority; far from it, he would certainly be stellenbosched, possibly "hung, drawn and quartered", so "scrounging", at least scrounging on a big scale, had to be done with consummate care with at least one eye always on the XIth Commandment, "Thou shalt not be found out".

Those of us who have been to the wars require no telling that the Mobilization Equipment Tables are lamentably deficient in

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many respects, but for the benefit of those who have never had to wrestle with a G 1098, I will point out that the provision made for transport in these tables is grossly inadequate. If we conducted our wars after the manner of our forefathers, Marlborough for example, and went into winter quarters directly the weather began to turn nasty, the War Establishments would doubtless suffice, but when one has to trek long distances from one area of mud and slime to a similar area, possibly worse, where are all the little what-nots to be carried which one has collected for the betterment of one's soul and the enhanced comfort of men and horses? Not on the official allowance of transport or that would be altogether too grievously overloaded, and the overloading of horsed transport is one of the unforgiveable sins, so with pain and grief much that one longs to carry has to be jettisoned for the benefit of others; a thought that should bring solace to the heart of the unselfish but somehow singularly fails to have any such effect on the ordinary mortal.

This is a dreadful state of affairs and hardly to be borne; can it be remedied? There is only one way: keep your eyes skinned and look out for what you can scrounge. A battlefield affords frequent opportunities: *experto crede*: for what has been struck off as "destroyed by enemy action" is no longer any concern of the one-time owners. Now there was a certain Divisional Ammunition Column which contained some absolutely champion pickers-up of unconsidered trifles; so much so that whenever the column lingered for any length of time in one particular area, it was noticeable how much better the men were "housed" than most of their neighbours, and in what remarkable condition the animals were kept.

But as the "owner" of this column had a rooted objection to any overloading of the wagons, an objection to which he was wont to give expression in rude and forcible fashion, whenever the column moved most of its "takings" had to be left behind for the next fellow. While the aforesaid owner objected to overloading, it went to his heart to have to forsake so much good "scrounging", so when he saw a chance of increasing his means of transport he took it without any hesitation.

The chance arose in this way; a subaltern, coming back with

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empty wagons from the gun-positions, had noticed a derelict G.S. wagon with one wheel gone; this he reported on his return, word of it came to the Colonel and the subaltern was forthwith pushed off into the night with a pair of wheelers and a spare wheel and told to find that wagon and bring it in before anyone else got hold of it. Thus was a perfectly good extra G.S. wagon scrounged for the benefit of the D.A.C. community; one wheel, and a little paint, and a wagon had been snatched from the burning. The performance was repeated on another night and the transport troubles were thenceforward very considerably lightened. Actually a third extra G.S. wagon was added to the bag very shortly afterwards: this was spotted, discreetly hidden behind a pile of old farm carts in a village through which the column was trekking, and promptly annexed. It bore the device of a corps, but that was very easily remedied! If a Corps staff cannot look after the Corps wagons, there are plenty of others only too ready to do it for them, and certainly a service wagon is more appropriately situated with an ammunition column than with a village Maire.

What is the subject uppermost in the soldier's mind as he wends his weary way, afoot or on horseback, in war or peace manœuvres? Dinner, a good hot dinner, just that and nothing more. According to the Olympian gods who have the ruling in these matters, the artilleryman has no need for a hot dinner; if he wants one, he can jolly well wait until he gets to his destination; but for the infantryman the gods aforesaid supply a dinky contraption known as a travelling kitchen—in the vulgar tongue "a cooker"—so that when the mid-day halt is made, there is the good, hot dinner, just waiting to be eaten. How came it then that No. 1 Section of that D.A.C. which later was to be so fortunate in the matter of G.S. wagons, used to trail along with it, not too obtrusively be it noted, a cooker complete with tins? If people will be so careless as to ditch a cooker and so foolish as not to realize that a linch-pin can be improvized to replace one that is missing, they must expect to lose it, even though they have removed the tins and left an apparently valueless framework at the mercy of the passer-by. Anyway No. 1 Section scrounged the framework of a perfectly good cooker and, belonging to one of the earlier Kitchener Divisions and so brim full of tradesmen of every sort, it did not take long

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or cost very much to fit the framework with the necessary tins; and there was anyway one small body of artillerymen who could rely on getting a hot dinner when it was wanted.

There was an amusing after-the-war sequel to this "Rape of the Cooker". The old warrior, who had been "dug out" of a well-earned retirement to command the D.A.C., was sitting in his club, somnolently smoking an after-luncheon pipe, when his attention was caught by an animated conversation between two fellow-members—"Buckets? my dear fellow, what's a bucket more or less? I tell you one of your infernal gunners sneaked off with one of my battalion cookers, right under our very noses, too: the silly clown in charge had managed to ditch the darned thing but, being close to billets, wouldn't bother to pull it out at once; just left it to be called for later. He took off a wheel, pocketed the linch-pin and removed the tins and thought he had made all safe, but when he came back with a fatigue party the cooker had vanished, and I know that one of your fellows was responsible as we were the last battalion and there was nothing behind us but odd lots of artillery ammunition columns." And old D.A.C. smiled as he murmured to himself "I often wondered how P—— had managed to scrounge that cooker".

From all this one may perceive that it is sometimes possible to alleviate the grosser discomforts forced on one by an unsympathetic War Office but it means a vigilant eye and a ready grasp at what a golden opportunity may present. As a specimen of scrounging on a really large scale the following would be hard to beat. Those of us who were charged with the care of animals in any quantity and had the misfortune to be wallowing in the mud of Flanders will never forget the desperate efforts we had to make in order to provide some sort of surface on which a horse could stand; in fact it would be little exaggeration to say that we have "horse-standings" engraved upon our hearts. In the Salient things were not too bad as we had the whole of Ypres at our disposal, bar the Cathedral and the Cloth Hall, and could, and did, remove vast quantities of broken bricks and other rubble but it was a pesky risky business: not so much from the Boche shell as from the ever-present danger of whole buildings coming down with a wallop on the waiting teams and wagons, bringing the amateur house-

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breakers down with them. But when out of reach of Ypres the matter of horse-standings drove the commanders of horsed units to a pitch of desperation; one simply had to find something solid to put under the animals' feet or they would be up to their hocks in twenty-four hours, belly-deep in forty-eight and quite incapable of doing any honest work within the week. One could change the lines daily but, space being limited, this could not be done very often. What added fuel to the fire of such a commander's wrath was the constant nagging from Division; this sort of thing—on the telephone. "Brigade Major speaking—Good morning, Colonel—sorry to have to worry you again about your horse lines but the Corps Commander was motoring round your way yesterday and rang up Division this morning, full of complaints; Division passed them on to us and we've got to pass them on to you—'perfectly disgraceful' is the main theme—and C.R.A. told me to ask you what you are going to do about it". The Colonel's remarks we will not repeat—paper fuzes more easily than wire—but the gist of them would be that he could not make bricks without straw nor horse-standings without bricks or their equivalents, and where the something or other could he get the what-do-you-call-'em bricks?

The B.M. would, in the tactful manner of a good B.M. addressing a colonel, try to smooth the ruffled feathers and comparative peace would reign for a day or two until someone else poked Division in the ribs and started the ball rolling again. And then one day, old D.A.C. having expended the whole of an extensive vocabulary of English and Hindustan objurgations in his remarks on the crass stupidity of staff officers expecting the impossible, the B.M. said sweetly, "Difficult, Colonel, certainly, but not impossible; ride over and have a dekkho at the Nth D.A.C.; I hear their lines are perfect." Now the Nth Division had just come into the line some five miles to the south where the ground was about as soft and soggy, if not worse, than the Colonel's own location. "Right," said the Colonel, "I'll ride over after tiffin." A pleasant ride brought him to the neighbourhood of his quest and, riding up a gentle incline, he saw down below him the long lines of a D.A.C. Even at a distance it was plain to be seen that the animals, mostly mules, were standing right on top of the ground, and the Colonel wrinkled his brows in perplexity. "Right down in the bottom of

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the valley," he thought, "about the worst place he could have chosen; can he possibly have struck a vein of chalk so far north as this?"—and trotted forward, eager to observe more closely such an unnatural phenomenon. As he approached he saw a long, lean figure, strolling about the lines, and recognized to his joy an old friend of bygone days. "Hullo! Long 'Un." "What! Toby, old lad; what good wind blows you along here?" "No good wind, Long 'Un, a chilly blast of wrath, emanating from Corps H.Q., but I'm devilish glad to find you here as I'd loathe pumping the secrets out of a stranger". "Secrets?" queried the Long 'Un, "all plain and above-board here; come and have a drink and spill your troubles." "The trouble is that I cannot keep my mokes from trying to dig down to Australia while you evidently can, and I've been sent round to find out how it's done. Put me wise, you slab of iniquity, and then I'll come along and sample your whisky". The Long 'Un hesitated for a moment, then "There's nothing to put you wise about—choose your ground carefully, that's all there is to it". An astonished stare and "Toby" laughed long and loud. "And you chose the bottom of a valley! Long 'Un, there is more in this than meets the eye, I'm going to have a look-see". Shaking off his friend's frantic clutch and paying no attention to his warning cry of "Look out, those mules will kick you to Hades", the stout old gentleman plunged into the middle of them and began to scrape away the film of mud with his boot.

He soon found what he was looking for and whistled in astonishment, for the lines were metalled! and with as good honest road-metal as ever went to the making of a road. "So that's the secret, is it? but where on earth did you get it from?" he asked as he came back into the open. The Long 'Un laughed rather shakily, "Never you mind where I got it from—how the deuce did you dodge those mules? Can't think why they didn't kick you sky high". "Kick me?" queried Toby, "why, damme, I cut my military wisdom teeth on a mule's hoof; fifteen years with the mountain gunners teach one a lot about mules but they do not teach one how to raise road-metal, so out with it and let me go and do likewise." But the Long 'Un wasn't giving anything away. "Sorry, old boy, really and truly sorry, but I simply dare not tell you. If you or anyone else started playing my game, the whole

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show would be given away and I would be for it, crucified first and court-martialled afterwards. I am off the map here and the bigger brass hats do not come my way, I can bluff the lesser lights, but if you were to follow my example you would be spotted in a moment and then your number would be up and mine too!" No more would he say in spite of earnest entreaty, except just this one sentence—"Seeing as you're an old pal, I'll give you a tip for future guidance—a bottle of whisky goes a long way", and with that cryptic utterance he closed up and the colonel had to ride home no wiser as to the solution of his problem than when he had started out.

The two friends did not meet again for nearly three years when their paths crossed for a few brief moments, long enough for a whisky and soda anyway, and at last the Colonel was able to get the meaning of that mysterious hint as to a bottle of whisky. He tackled his friend almost at once. "Look here, can't be any need for secrecy now, how the deuce did you get that road metal up at B—— and what did you mean by saying a bottle of whisky would go a long way?" The Long 'Un had to think for a bit but, more details having refreshed his memory, he was able to explain matters. "That was one of the finest bits of work I ever did, but I ought not to have said a bottle of whisky, a case would have been nearer the mark. I'll cut the story short as I must be off; you remember what a cursed soft country that was? Well, when I rode on ahead of my column to pick up my ground and found that I had been allotted the bottom of a valley, I nearly wept, as I thought of the state my animals would be in before a week was out. Then there flashed into my mind the vision of a truly magnificent dump of road metal that I had noticed as I rode along; quite a way back but not too far for me if I could get hold of some of the stones.

I pushed off at once to investigate matters and found the dump, acres of it, in charge of one solitary old miscreant, the typical "old soldier" with an obvious capacity for large quantities of alcohol.

He told me that the dump was on Army charge and not a stone was to be moved on any pretext whatsoever as the metal was for the roads we were going to make or re-make when we pushed the Boche out of Flanders; and that was 1915, mark you, makes one laugh, doesn't it? However, it was quite clear to me that if

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I wanted any of that stone, and I wanted quite a lot of it very badly, diplomacy would have to be exercised—always my strong suit, diplomacy, I ought to have been an Ambassador—so I tactfully introduced the subject of beer. Having arrived at the mutual conclusion that French beer was perfectly rotten stuff and no grown man's drink, I suggested that I might be able to help him bear his solitude by bringing him along a nip of whisky and the way he jumped at the bait gave me an idea as to a possible method of relieving him of some of his precious stones without his knowledge as it would certainly have to be without his consent. Off I went and made a 'bandobast' with my section commanders—so many men with shovels and so many empty G.S. wagons to be available while I had a crack with the Guardian Angel over a bottle of whisky in his dug-out—did you ever notice, by the way, how extraordinarily deep those sort of birds in the background, R.T.O's and such like, used to bury themselves?

All went according to programme, the whisky in the dug-out, the gunners and the wagons on the Dump, and that's the way I kept my mokes fit for work, but it cost me devilish near a whole case before I had extracted all the stone I wanted." That was real scrounging, no "finding" or "cadging" about the Long 'Un's feat, and the daring cheek of it!

Here's another case; not so risky to the perpetrator as was the Long 'Un's but equally clever. The first example was a case of "must" for the sake of horses, this one was for guns. In case anyone who knows not the ways of a gun in action may read this, I would explain that all cannon which carry a spade attached to their tails require more backing than is afforded by Mother Earth, while some, if you require real accuracy from them, must also have a firm and level surface on which to rest their wheels. If you have ever dealt with a six-inch howitzer, you will know that this otherwise excellent little piece requires a lot of material to prevent it digging itself out of sight in anything more plastic than rock or chalk; also that unless the wheels are set on something firm yet elastic, such as wood, it will not display that almost uncanny accuracy which is its chief merit. Thus both those in charge of horses and those in charge of guns are often hard put to it to find material which will most certainly not be provided by the Powers that be.

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When, in 1918, the tide began to turn and our armies started advancing by leaps and bounds, a certain heavy artillery brigade which had been left "in statuo quo" while its lighter brethren careered onward in company with the infantry and tanks, was suddenly ordered to pull out at once and move a considerable distance forward in order to help the leading infantry to overcome an unexpected line of resistance. Hurry was the word and the Brigade Commander, having passed on the order to his batteries and told them where they would find him, got on his horse (yes, on his horse, not into his car; he happened to be a relic of a barbarous age and preferred a horse whenever he could get a chance to use one) and rode forward to pick up the battery positions. Having got to his ground and chosen his positions, it occurred to him that the soil was rather soft and that the batteries would not be able to bring up the material necessary for bedding down the howitzers. Casting around to see what he could scrounge, he saw a little way back and to a flank an enormous dump of timber, lately the property of H.I.M. the Kaiser, and rode off to investigate. He found the dump in charge of an officer of a colonial corps who politely but firmly refused to part with even a splinter without a written order from his own Corps Q.

The Brigade Commander, as it happened, was attached to another Corps and he realized that to get such an order through the usual channels would be a matter of a day at least while he could not afford to waste an hour, much less a day. What was to be done? While he was pondering the matter, the Dump Wallah pulled out his watch. "Three minutes to two: sorry to seem so disobliging, Colonel, but you had better move out of this; the Hun puts down a strafe at two o'clock and again at five, as regular as clockwork; I'm going to ground for ten minutes or so and I should advise you to get clear of the dump before he begins", and with a hasty salute he disappeared under a huge pile of timber, whither his subordinates hurriedly followed him. The colonel moved off also and had hardly got clear when whoo-whoosh came a 5·9 right into the middle of the dump. After watching the performance for a minute or two, the Colonel rode off to meet his battery commanders, the while an idea germinated and sprouted in the fertile soil of an active brain. "Two and five as regular as

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clockwork; by Gad, I have it", and he stuck in his spurs and made off for the rendez-vous. Pointing out their respective positions to the battery commanders, he went on to explain his plan for collecting the timber they would certainly require. "There is enough timber over there for every gun position in France but none of it is for us without a written order from the Corps Q; we can't mess about waiting for chits from Corps so we must just scrounge what we want. I think we can manage it nicely without Corp being any the wiser. There is an officer in charge of that dump and while he is above ground there's nothing doing: but he goes to ground at two and five when, as he told me, Brer Boche puts down a strafe on the dump. I was there just now and, sure enough, at two to the tick the strafe began and everyone working there went down below: presumably at five to the tick the same thing will happen. Look here B——, do you see that pile of wood on the edge of the dump, near that little copse? There's a road runs up behind the copse. I want you to take a couple of empty lorries and a squad of men over there; be there, out of sight behind the copse, about ten minutes to five; send in a subaltern on a motor-bike to keep the chap in charge thinking of other things until he sees the whole dump crew safely below ground; he can signal to you as he rides back and no time will be wasted. You will have to do the job in ten minutes so warn the gunners that they will have to pitch into it smartly. With any luck you ought to get the lorries loaded and away before the strafe finishes. The shelling keeps pretty well to the middle so you ought to be safe enough out on the edge".

At about ten minutes to five that afternoon the dump crew were congregating near the mouth of their dug-out when a gunner subaltern came tearing in on a motor-bicycle and was accosted by the captain in charge. "And what do *you* want?" "Good evening: I say, what a ripping lot of wood you've got here; can I send along a lorry for some of it?" "Got an order?" "Order? What for? I want some wood for gun positions, surely I don't need an order for that?" "See here, young fellow, I've had one of your artillery colonels worrying me already for wood and I told him just what I'm telling you; no wood goes out of this dump without a written order from the Colonial Corps—got that? a

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written order". "Oh, hang it all", said the subaltern, "doesn't your bally Corps know that there is a war on? We simply must have some wood or we can't keep the hows. in action". "None of your blasted lip—your something hows. can sit up and beg but they don't get any wood without an order. Now skip out of this; the Hun is due to begin in about a minute, so if you don't want to get mixed up with a 5·9 you had better kick your starter and buzz off. Down below, you fellows, the evening performance is now due".

The subaltern, kicking his machine into life, wheeled round and, as he saw the Captain disappear, rode off, frantically waving his handkerchief. On the instant the little copse sprang to life; twenty lusty gunners flung themselves on the nearest pile of wood and began to hurl the baulks into the empty lorries which had emerged from behind the copse and backed down on to the dump. Ten frantic minutes, while the German shell played steadily on the centre of the dump, and the deed was done; two lorry loads of excellent timber for the batteries and no one the worse or the wiser!

Efforts at scrounging were not always as successful as were the examples already given; here is the story of a gallant effort which failed. During a spell of very hot weather the commander of an Artillery Brigade began to complain very bitterly about the temperature of the drinks served out in his mess. "In India", he remarked, "where it really is hot, one can always get a cool drink, even without ice. One simply hangs an earthenware jar in the shade where any breeze there may be can get at it and your water will always be cool. There's a tip for you, Doctor". Now the Doctor, who ran the Mess, was not only a medical practitioner of repute but was also noted for his success as a scrounger, and he realized that his reputation in the latter line was at stake. "Earthenware jars?" he thought, "where the deuce does one find earthenware jars?" Then he remembered that he had seen something of the sort somewhere, but where? Ah! of course, in the Cloth Hall at Ypres, of all unlikely places, and seizing the Signal Officer's motor-bicycle he was off. Fifty miles or so, but that was nothing to the Doctor who had gone much farther than that on a quest for whisky for the mess.

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Arriving at Ypres, which seemed to be enjoying a period of unwonted repose, he pushed his bike under cover and started to explore the ruins of the Cloth Hall. He was not long in finding what he sought but they were not jars at all, just common or garden flower-pots and most of them reduced to shards. However he found two sound big ones among the debris and resolved to try and make them do; they were certainly earthenware anyway. Dragging them out, he put them down near his bicycle and went off to look for any small portion of the Cloth Hall that would serve as a souvenir; a great man for souvenirs was the Doctor; once when he went home on leave he—but that, *pace* Kipling, is another story. Having filled his pockets with various attractive odds and ends, the Doctor wandered back to pick up his pots but, alas! they were not! Someone else must have hankered after earthenware pots for they had vanished and he had had all his trouble for some other scrounger's benefit!

* * * * * * * *

As a fitting wind-up I must repeat my previous warning as to the necessity for care in your proceedings. Whether successful or not in your scroungings, the Powers that be will certainly look upon your efforts with a jaundiced eye and will consider them to be an offence against good order as well as a breach of the VIIIth and Xth Commandments; see to it therefore that you take precious good care that you are not found out.

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A SHOOT IN BURMA.

By C. F. L.

THERE are at present only five Gunner officers stationed in Burma and as the country is somewhat out of the way few of us get a chance of shooting there. An account of a trip made a couple of years ago may therefore be of some interest.

There are plenty of tiger in Burma, but owing to the nature of the country they are difficult to get on terms with. You may of course just happen across one but the jungles are very dense with few dry nalas, fire lines, or natural tiger promenades where you can pick up tracks, water is very plentiful, and good tying-up places are hard to find. Young buffaloes to tie up are also hard to get hold, and expensive. In fact India is a much better tiger shooting country so it is advisable to confine one's energies to elephant, bison and saing. Saing (the Burmese wild ox) can be got in very few other places. "Elephas Indicus" is not a particularly easy animal for a poor soldier to get these days in India. Bison can very well be combined with the other two.

To shoot an elephant a special licence costing Rs50 must be obtained from the D.C. of the District. This licence entitles you to kill or wound one male elephant, usually within a certain area. A game licence is issued free to the holder of an elephant licence and entitles you to shoot two male bison, two male saing, and two serow, with a minimum limit on the horns of each. The time to go out just at the beginning of the rains. The reason is that you find your game by tracking, and until the rains soften the ground this is not possible. After the rains have been on for six weeks or so the undergrowth grows too thick to work through on foot.

There are many good shooting districts known to men in the Bombay Burma Trading Co., or Steel Bros., and there is always information to be gleaned in the Clubs in Maymyo or Mandalay. The one good book on the subject that I was able to find was Major Evans' "Big Game Shooting in Upper Burma."

It is not proposed to go very deeply into the question of equipment. You need very much the same as for India (C.P.) with a

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few additions. A waterproof coat which really is waterproof, and which will fold up small and go in a haversack is an important item, and your servants need waterproof coats or capes. Umbrellas for self and servants are very useful about camp. Milk is regarded as offal by the native and is practically unobtainable, so enough tinned milk must be taken for the whole trip. A well-equipped medicine chest is even more important than in India. Flies are apt to be very bad and a "Flit gun" with a good supply of "Flit" is very useful. If travelling by mule or pony, supplies should be packed in boxes of about 60 lbs. weight. A pony will take two of these, one on each side. As to rifles, a big double barrel H.V. is the favourite in Burma. I used a ·470 and found it ideal. Your licence only entitles you to kill or wound one elephant, which practically means you will only get one shot, as you are hardly likely to miss such a large animal at close quarters.

To get to my particular district I went by train to Mandalay, thence a day and a bit up the Irrawaddy by river steamer, and then sixty odd miles inland over a good road, which brought me to my H.Q. station. After a day there making arrangements, in which I received the utmost kindness and assistance from the D.F.O., I went on to my shooting ground, starting by road and finishing by pack pony. Once in camp my normal procedure was to get up early in the dark, have some food, wipe the oil off my rifle, check my kit, and start out as soon as it was light enough to see. All the heavy game feed in the early morning, but stop and lie up for the day somewhere about 9 a.m. They are much easier both to locate and get up to when feeding, hence the necessity for the early start. The kit for the day consisted of:—Rifle with sling, muzzle and foresight protector, cartridges, water bottle, haversack, with towel, sweater, dry shirt, dry socks, and camera, also waterproof, if not being worn, and tiffin tin with day's rations.

With me I took two trackers and a coolie. One tracker would go ahead travelling light, myself behind him, the other tracker next carrying rifle and water bottle, and the coolie in rear with the rest of the kit. A good method to adopt is to work quietly along a likely direction looking for tracks. If they prove good ones, you take them up, though you may go all day and come on nothing. Your shirt is soon sopping with perspiration; when you stop take

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it off, dry yourself with the towel, spread the wet shirt out to dry a bit, and put on the sweater. When you start again take off the sweater and put on the dry shirt. This was the only way I could find to deal with rheumatism.

When the tracks show you are getting close to your animal you take your rifle and must keep your eyes "skinned", be dead quiet, and watch the wind like a hawk; a cigarette takes a lot of beating to find out what the wind is doing. If you hear your animal before you see him, work up wind for the shot. In the very thick jungle in which you are working it is often difficult to tell if an animal is worth shooting, even if he is only twenty or so yards away. It is better to spend some time making certain, even if a few get away in the process than to shoot in a hurry and then find you have a worthless head. I now propose to give some extracts from my diary.

May 14th. Arrived in the morning at Shweyaungbin bungalow, on the main road. Sorted out two weeks' stores. After a delay owing to one of the ponies having strayed, we left at 3 p.m., arriving here at 5.30 p.m. It was a very steep drop down and the track was only fit for pack transport. The ponies' harness consisted of a wooden pack saddle, kept in place by a crupper made of string and wood, and a breast-piece. No girth, the saddle staying on (usually) by balance. Got settled into the *zayat,* and saw the moksos (trackers) Maung Sun and Maung Kay Too. (A zayat is an empty house on piles kept in most Burmese villages for the use of travellers, in fact a sort of guest house. Their cleanliness varies, but in the rains they have the immense advantage over a tent of dryness.)

May 16th. Sallied forth with two trackers and a coolie, and had some hard climbing up and down thick jungle-covered hills, through thick bamboo, and a little kaing grass. All the undergrowth soaking wet, and sweated like a pig with damp more than heat. After a lot of walking we began to find old elephant dung. Found a dead elephant, presumably one which had previously been wounded and lost. It must have been dead for some time. All the meat was eaten including the ears, but the skin on the head was still intact, and the hide still there. The left tusk came out easily, but there was no sign of the right one. We eventually found

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it to be a one-tusker, the right tusk being broken off short in the socket, only a small ring of ivory remaining, which we pulled out. All the ground for about ten yards around had been ploughed up by pigs for some reason I could not fathom.

Got home at 1.30 having been slightly rained on, and measured the tusk. Length 4 ft 10½ in., weight 43½ lbs. A very fine tusk for Burma. Great interest from the villagers who say it is a good omen. This village is quite interesting in its way. The people are Shans, very light coloured with Mongolian faces. Among other occupations they mine rubies, washing out great pits with water which they bring from long distances in graded ditches and bamboo flumes, some of the latter thirty feet or more deep in places. They say it begins to pay the second year.

I went to see a patient I have, who cut his foot very badly with a dah. His house is quite interesting. It is on stilts about six or eight feet high and you go up on a bamboo gangway, similar to a ship's one. The whole thing is made of bamboo, with a thatched roof. Among other articles inside are :—A rack for dahs, little shelves, a slatted window (no glass or substitute), flowers in pots, and cut flowers in bowls, A mat, brought for me to sit on, empty kerosene tins, home made lamps, zinc buckets, brass cooking and water pots, and most amazing of all an enamelled basin, soap and a towel, brought for me to wash my hands. Truly a progressive people. There was one sleeping mat in a corner with a screen of cotton cloth like a mosquito curtain, and apparently used for the same purpose. There was a second room behind the first, apparently a sleeping chamber. The daughter of the house was nursing her baby without worrying about me, in rather striking contrast to the shy maidens outdoors who bathe in the pool behind my zayat. The latter is simply stiff with flies—as bad as Egypt. The Hpoongyi kyaung (Buddhist monastery) is next door to me, and a very fine gong goes off at intervals. I also hear the learners reciting and intoning their prayers.

May 17th. Had a good tramp around this morning from 6 a.m. till 3 p.m. About 8 a.m. we came on fresh elephant tracks and at 8.45 came up with a "hine" (tuskless male). Ignorant sort of beast. Walked up to within thirty yards and watched him for a bit. He was having a rest in some fairly open, park-like jungle,

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among big trees, just standing there and flapping his great ears. Stepped carefully over a nasty-looking little blake snake on the way. Put up a pig in kaing grass, which went off complaining loudly, but I couldn't see it. This kaing grass is pretty punishing stuff, well over your head and you can only get through along animal paths. Also saw a lizard's nest. A lot of tiny little eggs in a little round cup scooped in the earth, mother lizard lying alongside pretending she wasn't there. We went on and through thick soppy, soggy jungle, "master" drenched in clammy sweat, but bearing up pretty well. Saw plenty of grey langur monkeys and some hornbills nearly as big as vultures, which I have never seen before. We all picked up a certain number of leeches and ticks. The flies here are also very bad, due, so the villagers say, to the paddy grinding mill about fifty yards away.

May 19th. Shot quite a good solitary bull bison to-day. Left camp at 6.15 a.m., having swallowed some food in the dark, as usual, and went off looking for elephant tracks. Went on all the morning and stopped for an hour or so in the middle of the day for food and a rest, then continued. Snatches of sunshine for a change to-day, which is pleasant. Came on tracks of a bison, but told the trackers not to worry about them and to stick to elephant. However, at 3.30 p.m. we walked into him. He was feeding in tall grass as we came through some thick bushes about thirty yards away and lifted his head and stood there staring, looking magnificent. He held his pose like a gentleman, almost facing me, till I put a solid from the ·470 into the base of his right ear, raking the whole body. At this he shut up like a pack of cards and dropped as dead as a doornail. His colour was coal black, except for little patches here and there, the size of a sixpence, of lighter-coloured hair.

His measurements were:—Right horn (tip broken), length 26½ in., girth 19 in. Left horn, length 27½ in., girth 19½ in. Both horns well corrugated. Height from the heel to the dorsal ridge above the foreleg was 5 ft. 8½ in. This however was not the highest part of the dorsal ridge, so his real height must have been even greater. Got back to camp at a quarter to six p.m.

May 20th. Went out accompanied by most of the able-bodied men of the village to dispose of the bison. This they did to some

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tune. They took every ounce of flesh off him including the stomach and insides, cut the meat into hunks of about a pound each, ran series of these lumps on thin sticks, built fires and then covered the fires on all four sides and on top with a sort of house made of these skewers of meat. They must have brought away over six hundred pounds of meat, and as much as they could carry in their bellies.

May 21st. After trekking all the morning we came in the afternoon on tracks of a single elephant. Followed the tracks and after a time heard him feeding in thick bamboo cover. Went around and got down wind of him and then advanced. Eventually almost butted into him. Could just see his great stern about fifteen yards off. The jungle was so thick that it was some time before I could get a view of the lower part of his head to see if he had any tusks or not. Sometimes we were in full view of his eye, only fifteen yards off, and once I thought he had spotted us, but not a bit of it. Of course we were keeping perfectly dead still. He eventually turned out to be another "hine", so we came away doing a rear-guard action. Saw bison tracks, more huge hornbills and a new kind of monkey. The latter is a small, black, furry chap, who flips about the very high branches, as often as not upside-down.

May 22nd. Off early, found tracks, followed them up and came on another "hine". Then climbed what seemed like the highest hill in Asia and found elephant dung all the way up, and right on the very top, too, though it seemed more like the place for a mountain goat to me. This was a most exhausting climb and there were clouds and mist on top, which did not make it any more pleasant. Later the rain came down and we had to struggle through masses of wet "kaing" grass, where we collected several leeches. Put up a few sambhar hinds and a stag on the way home, but didn't get a shot. On our way back came on tracks of a fresh elephant and followed them till nearly dark, but he was travelling and not feeding, and it was getting late, so we left them.

May 23rd. Off early and took up the tracks we left last night. Found a clear footprint eighteen inches across and began to cheer up, and later found marks where tusks had been dug into a bank. Then the tracks of another elephant joined in. They were travelling but tracking was fairly easy, so we could slip along. At twelve

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o'clock came up with a very big elephant facing away from me. Worked in close and as he turned so that I could see his head and I was all ready to shoot, he turned out to be another hine. Enough to break one's heart. Followed the tracks back to where the other elephant had left this one and took the others up, but an absolute deluge of rain came down and obliterated everything, so we started for home, arriving in camp about dark. During the course of the day we came on a baby elephant which had apparently been killed and certainly been eaten by a tiger. Had a good study of the brain cavity which was nine inches long by five inches high. To add to the general joy I fell off a rock into a stream, besides being rained on and bitten by leeches. Saw several sambhar hinds.

The next few days were of no particular interest, being much the same except that a touch of fever, and internal trouble curbed my activities a bit. We propitiated the local jungle spirits to the extent of twelve annas worth of pice, well polished, and delivered by the moksos.

May 28th. Slew our elephant to-day. Came on fresh tracks at 9 a.m. and in a very few minutes heard him feeding quite close, smashing bamboos, and making a great noise. Got the wind right and advanced to the attack. Saw him first about thirty yards off, and below me. It was a pleasant surprise to see a pair of tusks. I was starting to work up close to him to try for the ear shot, but he turned and came slowly towards me. At less than fifteen yards I let him have it in the bump. A dead easy shot as he came out into one of the few open patches. He just collapsed at the shot and I went closer and gave him some more to make sure he did not get up again. The circumference of the foot I made 51¾ in., which would make his height 8 ft. 7½ in. I measured the height as best I could as he lay, and as it came to considerably more (well over 9 ft.) it was probably wrong. His right tusk measured 26 in. outside the gum, which should make it about 4 ft. 5 in. (The tusks actually measured 4 ft. when removed, ivory in Burma being very small compared with Africa.) Tusks rather slender. Cut off his tail and came home in triumph, the trackers taking the tip of the trunk which is apparently a great delicacy.

A few days after this I moved camp to a better bison district, shot another bison there, and on June 4th moved camp again to

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saing ground, on flatter country closer to the Irrawaddy. Here I lived in quite a fine zayat belonging to the Forest Department. The mokso I had at first here wasn't much use, though a decent fellow, and after a few days I sent for another tracker.

June 5th. Pretty hopeless sort of morning. Started off at 6.30 and soon came on fresh saing tracks, but could not induce the mokso, Maung Tambu, to follow them. Later we came on tracks of a solitary bull, and after much trouble I induced him to take them up, but he soon lost them. Then we put up a good solitary bull, presumably the same one, but of course he had seen us first and was off; the mokso jumping about and waving his arms in case he wasn't sufficiently frightened already. Then we gave up the unequal contest and came home, having covered over 15 miles.

Fairly hot here. There seems to be any amount of game about. Put up four barking deer and a pig, and saw any amount of saing and sambhar tracks and a lot of elephants. Went and watched about ten of the latter from about 40 yards off. They were resting, some standing, some lying, and were quite interesting. I wanted to give them my wind from some place where I could see what they would do, but could not get a place to see. Another herd stampeded and went through the jungle like a battalion of tanks gone mad.

June 6th. No rain lately. The only interesting thing to-day was a large elephant with small tusks, who we found bearing down on us, quite oblivious of our presence, as we rounded a bush. We quickly retreated out of his way and let him get our wind, whereat he and some others from somewhere close by made off at a great rate.

June 7th. On the way back to camp got news of a tiger kill, and went off to investigate. The kill was unusual and interesting. A nearly full-grown buffalo, with not a mark on his neck. There were a few scratches half-way down the back, evidently where the tiger had jumped on him, both hock joints had been bitten and broken, and a very small part eaten directly under the root of the tail. There were pools of blood for about a hundred to a hundred and fifty yards, where the poor brute had evidently tried to escape, and as far as one could see the tiger had made no effort to kill it, except by eating the piece out from behind. The neck was un-

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broken and untouched. From the size of the tracks it was not a very large tiger.

We put up a machan, and I sat up from 3 p.m. Got badly bitten by mosquitoes and at about 8.30 p.m. it started to pour with rain. Stuck it out for some time but by a quarter to ten rifle, cartridges, torch, self and everything I had were soaking wet, and I decided to give it up. Whistled the men to come up, but no response. Then tried shouting, and finally fired a shot and whistled and shouted again, but still no response. Then let my rifle and haversack down from the machan on a string, climbed down myself, and headed through the wet dark jungle in what I hoped was the direction of camp. By great good luck came on my men before long, and got back to camp at 11 p.m. thoroughly miserable. Whisky for all hands, hot coffee and quinine, and then turned in.

June 8th. Got a very good bull saing to-day. Came on tracks of a herd at 7 a.m. Tracking easy after the rain and Maung Hlaing, a useful tracker, has arrived at last, thank goodness. About 8.15 the tracks were red hot and leading into thick stuff, evidently to lie up for the day. They then went up a defile, straight down wind. There seemed nothing else for it but to follow them, as there was no knowing whether they had stopped or gone on. On breasting the top of the defile there was a crash, and off they went, having been lying down just over the crest. I had been expecting this, so was not really annoyed. After giving them some time to get over their fright we took up the tracks again and very soon came on them in "indaing" forest. This time the wind was on a flank. Maung Hlaing and I crawled up on our stomachs to within about eighty yards, and I watched them with glasses for about an hour, getting nearer whenever I could. There were two good bulls and Maung Hlaing kept urging me to shoot, but I did not want to make any regrettable mistake. Eventually most of the cows lay down and the best bull went off to one side and gave me a shot. There were a lot of trees and bushes between us, and whether the bullet was deflected by them, or whether it was a bad shot I do not know, but it certainly did not touch him. They all jumped up at the shot. I did not move and they could not see me. They then went slowly off. I could have had another bang at the old bull, but did not like to risk hitting one of the cows, which were all around him.

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As soon as they were out of sight we went and looked for blood, but found none. We then took up the tracks again, and to my astonishment came on the herd settling down again, within a quarter of an hour. They had neither seen nor winded us, nor heard anything except the shot which had done no damage, but I had hardly expected to come on them as soon as that. I worked up to within sixty or seventy yards and got the big bull in the shoulder with a solid nickel bullet. It went right through his lungs and out the other side, and he was down within forty yards, when I gave him a not altogether necessary finisher. His measurements were :—Right horn, length 25¾ in., girth 17 in., left horn, length 25¾ in., girth 16¾ in., span 34¼ in. Curiously enough he was a chestnut colour, almost the same colour as the cows, though Maung Hlaing insisted he was much darker. He was of course twice as big as any of them. The "In" trees in this country were very close together, and though one could see some distance it was hard to get a clear shot at the part of the animal one wanted to hit.

That night I got fever very badly and so did my bearer and the local mokso. I eventually had to go off to the nearest doctor and it was nineteen days before I could get about again. I was back again on the 27th.

June 28th. Sat up pretty late looking after my bearer, who had a very high temperature, and had to wake myself this morning. However, his temperature was down again, and I got off by 6 a.m. Had to go pretty slow. About 7.30 came on fresh saing tracks—tracking easy owing to rain last night and this morning. Eventually jumped them lying down at 8 a.m.—most unreasonable. Sat down and had a cigarette to let them get over the excitement, and taking up the tracks very quickly came on them again, a bull and one cow. Advanced unobserved with the mokso to about seventy or eighty yards, when they began to get suspicious, so we sat down and I got busy with the glasses. The mokso insisted the bull was an "atee gyi" and implored me to shoot, but he seemed to me to have rather a smaller head than the last one so I held my fire.

After staring in our direction for about half an hour he and the cow lay down evidently not having spotted us. We thereupon advanced to within about forty yards. He still seemed to me not quite good enough, though eminently shootable. Crawled up a

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little further, when he got suspicious and stood up. He was a fine big animal, and looked grand. He couldn't quite make us out, and advanced a couple of yards, stamping and snorting. I thereupon snorted back at him. He answered this with a stamp and another snort, and advanced another couple of paces. A *very* fine sight indeed. After a minute or so of this he seemed quite close enough so I stood up. He jumped sideways in surprise, ran off about ten paces, and stopped again. After a prolonged stare he and the cow trotted off. We then came home. Altogether a most interesting morning.

June 29th. Shot a one-horned saing this morning, the one horn being a magnificent one of 29½ inches. Came on tracks of a solitary bull at 6 a.m. only a mile from camp. They led us round in half a circle through very thick cover, and as we were following them along I suddenly spotted him the other side of a bamboo clump. His white rump gave him away. Took the glasses and made out one enormous horn, so let drive with a solid bullet through the bamboo clump, the bullet getting him in the middle of the neck and dropping him stone dead. On going up to him I found the right horn missing, having evidently been broken off in a fight quite recently. The left horn, however, measured 29½ inches and the spread from the centre line of the forehead to the outside of the horn was over 20 inches, so his spread must have been over 40 inches.

Took the tracks back for some miles in the faint hope that we might find the scene of the battle and the other horn, but the tracks came round in a circle to within twenty yards of where I shot him, where I gave them up. The tracking kept getting more difficult as we worked back, and we had had deluges of rain within twenty-four hours, so there was not really much hope of finding it. It must have been a most stupendous crack to have smashed the horn off. His colour was a light chestnut, and the grey of his face was distinctly blackish. I doubt if he was as big in the body as yesterday's bull, though there is no comparing the length of horn. Wandered along the choungs in the evening looking for tiger tracks. Needless to say, found none. Mokso got fever.

Now as I had all I was allowed on my licence and it was so unhealthy, I packed up and went back to civilisation. This extract

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reads rather as if I was shooting animals nearly every day. This was by no means the case, and is due to the blank days being left out. Actually I only fired at six animals, including a barking deer for the pot, in all the time I was out. I cannot say enough for the help and kindness I received from the D.F.O. He told me where to go, showed me the brain shots on a tame elephant, looked after me when I was ill, helped me in every possible way and was chiefly responsible for the very interesting and enjoyable time I had.

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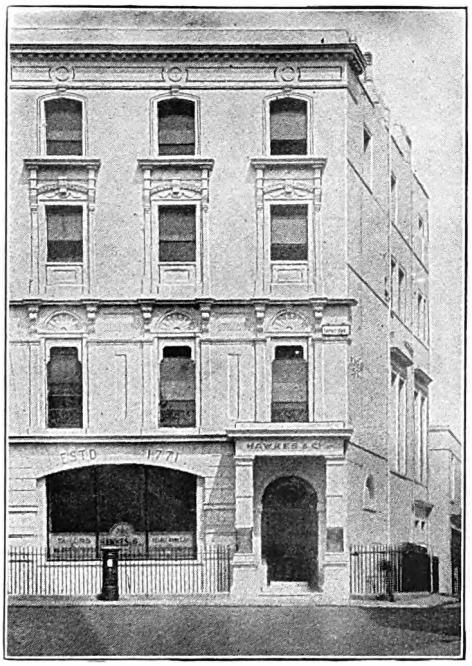

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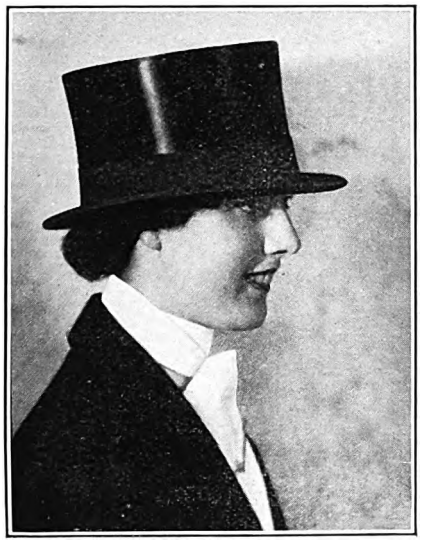

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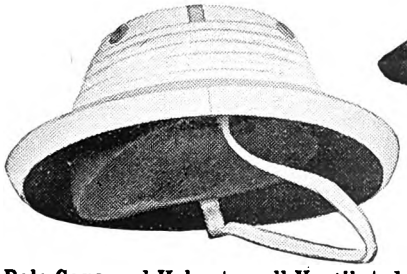

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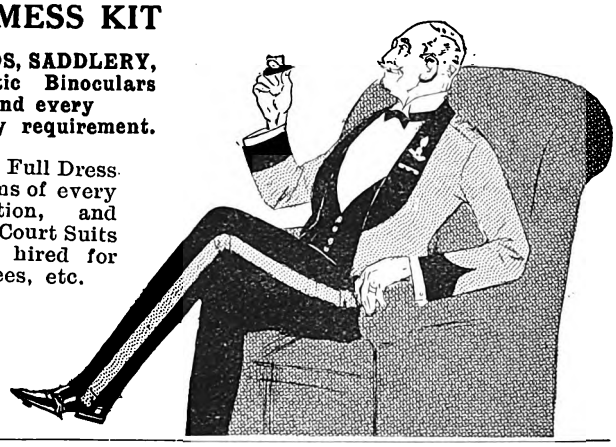

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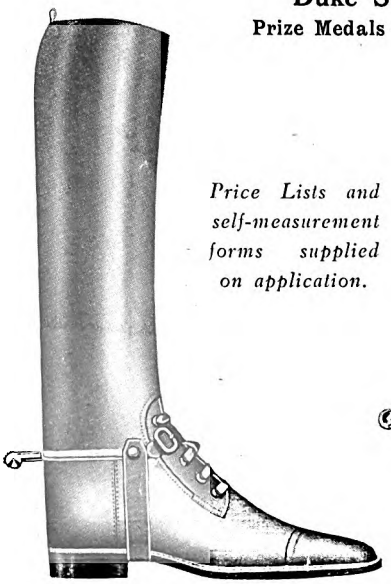

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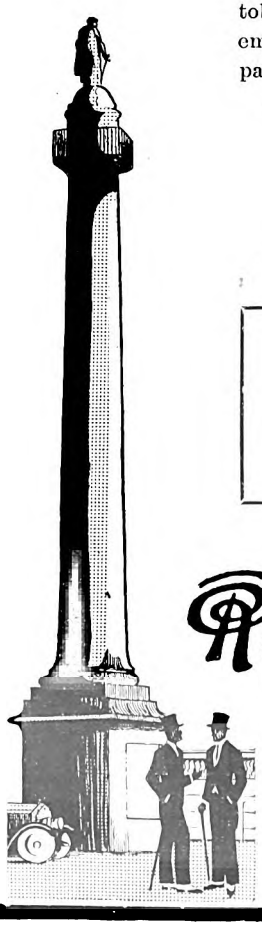

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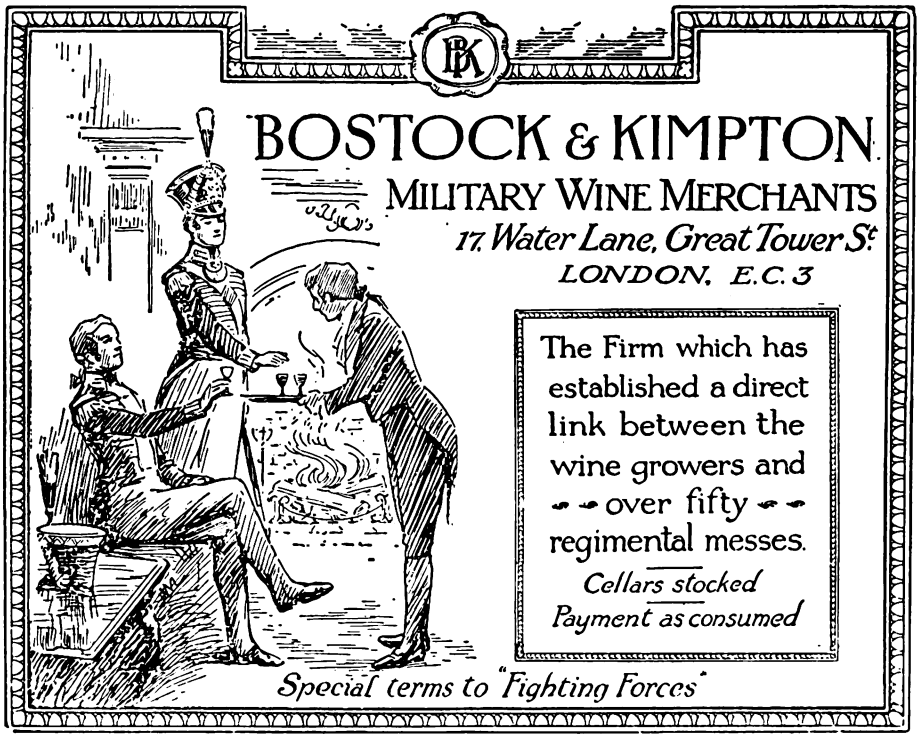

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